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LANGUAGE: A SCIENCE OF HUMAN BEHAVIOR

LANGUAGE

A SCIENCE OF HUMAN BEHAVIOR

BY

HARRY R. WARFEL

CLEVELAND
HOWARD ALLEN, INC., PUBLISHERS
1962

LANGUAGE: A SCIENCE OF HUMAN BEHAVIOR

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Published in Cleveland by Howard Allen, Inc.,
Box 1810, University Center Station
Cleveland 6, Ohio
Library of Congress Catalog Card Number 62-9619

ACKNOWLEDGMENT

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To

RUTH FARQUHAR WARFEL

1898-1961

"None knew her but to love her;
None named her but to praise."

PREFACE

The mechanism of language is the theme of this book. Every human being has the same speech apparatus and activates it in the same way. The sound system and the syntactic system may be different from tongue to tongue, but the principles of operation are identical. By examining the production of English speech, I have tried to find the elements, procedures, and principles which make up the code of a language. In doing so I have been led to discriminate between the code and the vocabulary. Both lie latent and potential in the human mind, but vocabulary activates the code much as the insertion of a problem energizes a previously adjusted computer. Behind all is a set of basic sentence patterns containing positions of the major word-classes. Words and word-groups flow into these positions. Adjustments are made to harmonize the forms of words, and finally the individual phonemes emerge to give the oral message. These four levels of simultaneous operation create the fabric of discourse. It is a marvelous mental and physical activity. Writing, a surrogate of speech, has its own code and principles.

The coded nature of language opens the way to a theory of the origin of language, to an analysis of the way vocabulary presents meanings, and to the source of literary power in the structure of language. The teaching of reading and writing is discussed in terms of structure, and finally there is a chapter on the relationship between language and society. Language, a set of human habits, is here viewed as a science of human behavior.

The theories in this book extend some of the concepts stated by Edward Sapir in *Language* (1921) and by Leonard Bloomfield in *Language* (1933). These two authors shifted attention away from the message to the code. In my opinion the overriding principle of language operation is functionality, the conception that fixed positions are filled by constants and variables. This idea, first developed in phonemics, was conclusively demonstrated by George L. Trager and Henry Lee Smith, Jr., in *Outlines of English Structure* (1951); on their demonstration of the three levels of pitch in vowels I build my notion of melody in language. The importance of word-class positioning as a clue to the coded nature of language is implicit in Charles C. Fries' *The Structure of English: An Introduction to the Construction of Sentences* (1952). The principle of functionality in sentences, the substitution of word-groups for word-class members in the basic positions, was first explained in detail in *American English in Its Cultural Setting* (1956) by Donald J. Lloyd and Harry R. Warfel.

Portions of chapters of the present book were printed first in *College Composition and Communication* (Chapter VIII), *College English* (Chapters IX and XI), *Journal of Developmental Reading* (Chapter X), and *The CEA Critic* (Chapter II). The theory of the origin of the basic N V N sentence resulted from conversations with Harold B. Orton, Director of Mathematical Research, Teaching Machines, Inc., Albuquerque, New Mexico.

HARRY R. WARFEL

Gainesville, Florida
October 3, 1961

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CHAPTER I

THE NATURE OF LANGUAGE

By his fifth birthday a child can outtalk his parents. He usurps the whole dinner hour with his comments and questions. He chats with all who will listen, and, when no one is present, he tends to talk anyway. His waking moments are devoted to saying, over and over, what he knows. By the time he enters public school at six he has command over almost all of the structures of the language and over the vocabulary which he has heard and which is within the range of his mental maturity. His expertness is such that, when he is irate, he can box his parents in a corner with his clamoring speech. The only way they can free themselves is by bribing or punishing him. The remarkable thing is not that he can talk, for speech is the common possession of humanity, but that he can talk so well. His chief way of entering the human race and joining its activities is by speech. Intuitively he knows that his belongingness rests upon his ability to ask for what he wants and to say "No" in varied ways. At this age he is already called "a little man," largely because his power over language gives him an independent status in the home. As he grows older, this independence increases.

But unless special attention is paid to reading and later to writing, something goes amiss with about half of the children. Their expertness in speech is not matched by an equal skill in reading and writing. Somewhere between kindergarten and the fourth grade they become the disinherited. They cannot perform the skills which the school is set up to teach. One of the scandals of our times is the inability of high school and college students to lift thoughts from the pages of newspapers and books, put their own notions into acceptable English prose, or to spell the commonest words.

What is wrong, one may ask, that children of five or six with real language power should be unable to read and write at ten, should be scorned as problem children at fourteen, and should be allowed to leave school at sixteen as incompetents in their native language?

The answer is that, because the nature of language is not rightly understood, schools base their language instruction upon wrong principles.

It is wrong to assert that some children do not have a "language sense."

It is wrong to assert that some normal children lack the intelligence to read and write.

It is wrong to assert that some otherwise bright children lack ideas and hence are unable to express themselves.

It is wrong to assert that some normal children lack ability to learn vocabulary and therefore are doomed to a narrow mental life.

The facts are that every child desires to use language as capably as he can, that children who fail to master the school program in language usually develop special skills in teenage in-group speech, and that well-designed remedial programs effectively and quickly lift interested retarded youngsters into competence.

No school child needs to be a retarded speaker, reader, or writer.

Speaking, reading, and writing are skills like walking, riding a bicycle, playing a musical instrument, or sewing. Language is a performance. Talk about language does not help a child's performance very much. Traditional parsing, diagraming, and etymologizing seldom help a child to speak or read or write better. What improves a child's language most is his use of it, his building of habits of effective speaking, reading, and writing. What teachers and parents need is an awareness of the nature of language, the principles underlying it, and up-to-date methods in teaching it.

I

THE CONTEXT OF PHYSIOLOGY

A fundamental fact about language is its source. Language emanates from the human body as an integrated action. Millions of cells and hundreds of muscles in widely separated parts of the body participate in the production of vocal sounds. The exhaled breath stream, whose source is in another integrated bodily activity, is the sound-producing element. To achieve a symbol system, man might have clicked his teeth, wrinkled his nose, clapped his lips or hands, and wiggled his arms, hands, feet, ears, and torso. Indeed, some people do make some of these bodily movements as meaningful signs. But, whatever the reason, mankind settled upon a code of sounds as the major message-carrying system of communication. The ease of ear as opposed to eye perception in darkness may have been determinative. Or possibly it may have been the comparative ease in the coding and decoding of vocal signals. Or, most likely, the reason may lie in man's possession of an extra portion of brain that is found in no other animal. Drs. Wilder Penfield and Lamar Roberts in *Speech and Brain Mechanisms* (1959) assert that "there is a very large increase in the extent of the temporo-parietal cortex that becomes obvious in passing from anthropoid ape to man. It seems likely that the posterior speech area of the human cortex constitutes a new appearance" (p. 238). If so, man uses speech as a result of his brain structure. Still, the reasons for this great decision by primitive men remain open to conjecture.

Quite startling is the realization that speech is an occasional and irregular activity that occurs, usually, in periods of wakefulness as a result of some stimulus, whereas breathing is a part of the unceasing activity of the autonomic nervous system, which maintains the constancy of an individual's life process. The harmonizing of these two integrated systems is like that of winding a bobbin of thread by attaching the bobbin to the axle of a ceaselessly turning water wheel and then hooking on and breaking off the thread. So in speech the instrument language is attached to the breath stream, and a particularly coded message makes the instrument perform its role. Two totally unrelated activities are thus brought into harmony by man's ingenuity. The ongoing process of breathing, found in all animals, was adapted by man to serve as a vehicle of another process. Animals make vocal sounds. But only man developed these sounds into a maneuverable symbol system.

Man's primacy over other animals resulted from this capacity to discover and utilize for his advancement nature's regularity and stability. Other animals experienced nature much as man did. To a degree they adjusted their external environment by seasonal movements, by hibernation, and by amassing food supplies. Some achieved a degree of internal environmental change: stings, venoms, hard shells, furry exteriors, and the camel's water pouch are examples. Yet only man was blessed with the gift of — or acquired the facility to employ — language.

Because the production of language lies deep in the human anatomy, the resultant operations share, analogically at least, the principles governing the whole body and also those areas most involved in speech production. Some of these principles deserve statement here. The human body is an independent organism. A fetus grows without nerve connections to its mother. Whatever the food line of the umbilical cord may carry to a fetus from a mother, language is not thus transmitted. The heart begins beating in the fourth week; its regularity becomes a primary internal condition for survival. Biologically the growing yet unborn child has those latent and potential powers which his genetic structure provides. His first act at birth is to suck in air and moments later to exhale. Then throughout life the continuation of regular respiration is another condition of his survival. Pulse and respiration have their own periodicity, their own volume and pressure. Similarly the digestive process proceeds with its own ceaseless regularities. These separate yet harmonious and regular actions suggest that any human activity, especially if it consistently and continuously employs parts of the body as its mechanism, must possess a similar stability and regularity. Thus it can be postulated that language, the product of the integrated mechanism of the speech tract, must be a stable and regular system.

The central nervous system, which is the determiner of all bodily behavior, is a communication system. It sends its messages from receptors (sense organs) through neurons (nerve lines) to effectors (muscles); simply stated in terms of telephony, an electric impulse is encoded by a sender, transmitted over a channel, and decoded by a receiver. The basic principles of this communication system are that the signals must be surrogates of the stimuli, that the signals must be discrete and identifiable by the encoder and decoder, that the number of different signals must be few rather than many, that the signals must move sequentially and in an established order, and that the transmitted message is an arbitrary one related to the system and not a random one introduced from outside the system. It must be assumed that a principle of linearity underlies the principle of sequential transmission of messages from one pin-pointed receptor cell to its effector or muscle cell. When many receptor cells send a variety of related messages, as in the eating of a peach, the sensations are transmitted in such a way as to achieve coherence and unity. Within this organized whole there is also a dominant or emphatic or stressed message. When the five senses report simultaneously upon the same sensory experience, a harmony not unlike that of counterpointed melodies occurs. A vast complex of cells somehow manages to encode a variety of messages, sends them to a decoding station, and there an integrated response follows, a response that has the attribute of form.

Since the nervous system is the originator of speech, it seems a necessary conclusion that the procedures in forming speech must be in harmony with the methodology of the nervous system; that is, the outward and inward systems must be analogous and must achieve their results by identical principles. If this reasoning is correct, then the following principles must be postulated for language:

1. Sound signals are surrogates of experience.
2. The signals must be discrete, few in number, and invariant in structure.
3. The signals move in a linear sequence in a regular order.
4. The order of the signals provides for coherence, unity, emphasis, harmonious and connected relationships, and for an ultimately identifiable form. Thus language must be a stable system.

Since Rashevsky has demonstrated the esthetic quality of the nervous system and since many writers have described the esthetics underlying the construction of the human body, it may be postulated that

5. Language inherently has esthetic properties.

The fact that language supplies the malleable medium for works of verbal art needs no demonstration. One of the postulates of this book is that

6. Literary art achieves its highest beauty by successfully exploiting the principles of language operation.

Another principle is that language is a physiologically produced phenomenon whose mechanical operations are describable and measurable as human behavior patterns. The physiology of the nervous system and of the speech tract provides useful data about the initiation and production of speech, but speech itself is a mechanism or instrument that can be observed without reference to its producer, the human body. A long tape recording, for example, can contain enough illustrative material from which to abstract a fairly complete grammar of a language. In this sense, language is like a baby; it is an independent product of its parents, and though in its origin and formulation it shared parental traits and influence, it has become an entity describable in terms of its own behavior and not theirs. Language is a form of externalized human behavior. An account of this behavior will constitute the substance of this book. The fact that language can be internal as a subvocal manifestation or can be written by graphic signs must not becloud the issue, for internal or silent speech and writing are adaptations of spoken sounds. The varied uses of language must never keep us from remembering that speech is uttered, that it flies from the human body, and that once it is uttered it can never return to the mouth of its maker. Only metaphorically can a person "eat his words."

Another postulate about language is that language cannot be more complex than the speech tract that produces it. Language is a set of behavior patterns like walking. Walking is an externalized result of acts initiated and controlled by the nervous system, but the act of walking is performed by an integrated set of muscles in the torso and legs. The gross and finer movements of a person's walking can be charted as behavior patterns. These movements though numerous are countable, the distances spanned by each muscle and limb are measurable, and the combinations of activity, whether simultaneous or successive, are describable. A person can traverse the same area, but he never again can take the same steps which he took a moment ago. The integrated act of walking is far less complex than the nervous system's acts in effecting the successive steps. Similarly the behavior patterns of speech can be counted, measured, described, and reduced to rules. Similarly, too, the phenomenon of speech is an integrated system of actions that must be less complex, yet as completely organized, as is the speech tract.

II

THE CONTEXT OF SOCIOLOGY AND ANTHROPOLOGY

Language is a mode of social action. At least two persons are involved in a conversation. The primary purpose of language is to transmit a message from one person to another, so that the receiver has in his mind the transmitted message. There are more complex problems related to decoding, such as channel noise that blurs the sender's sounds, impaired ear perception, and association of incorrect meanings with some sounds. Important as these matters are in the social use of language, they are not relevant to the main theme of this book. What is important, however, is the fact that both the sender and receiver must work with the same language sounds and that ideally each person must attach the same meanings to the uttered sound sequences. It needs no arguing, therefore, that a discrete language system must have a degree of fixity in it, so that mutually understandable communication is possible. This fixity, paralleling that in the nervous system and in the speech tract, apparently must be in the seeming identicalness of elemental sounds, words, structures, and patterns, so that any specific message can be repeated in the same form as that of the original. Fixity and sameness in speech, as in walking, are relative rather than absolute values. The identity of a known but hidden speaker can be determined quickly, no matter what the sequence of his speech may be, by the musical quality of his voice. Yet it is demonstrable that no two utterances of the same sequence have wholly identical acoustic expression. The paradox of simultaneous identity and difference apparently causes no practical difficulty to speakers in the same speech community, for the social action of language is not adversely affected by this circumstance.

The societal context of speech provides other concepts of language. The most important of these is that a discrete system of language is a product of its users. Language is a mechanism whose fixity makes human society possible. Yet society uses the mechanism to transmit a great variety of messages. For ease in use, then, the mechanism must remain fixed while the messages vary. If both the mechanism and the messages were readily alterable, the employment of the process would be beyond the ability of many people. A law of economy of means, therefore, must exist in language, and the point of greatest economy must be in the system. Hence a distinction must be made between the system and the message. A wagon or weaving machine, a bake oven or a stew pot is a comparatively changeless mechanism, whereas the substances in relation to which these instruments fulfill their purpose are ever-changing. It must be postulated, therefore, that there are two entities in language as a social mechanism; they are the fixed system of recurring arrangements of sounds and the occasionally used sounds that carry a particular message. Thus identity and difference constitute essential qualitative ingredients in language. An account of these two elements will be given in detail in later chapters. Here it is sufficient to state that these two harmoniously interwoven entities are called the code and the vocabulary. The code is the total discrete language system as it reposes latent and potential in the minds of adult natives in a speech community; this system is a set of habit patterns that can remain unused for long periods of time and then be called into operation by an appropriate stimulus. The vocabulary is a set of surrogates for experience; these, too, latent and potential, are stored in the mind until activated to come forth simultaneously with the needed portion of the code. The physiology of the nervous system makes possible this simultaneity.

Thus it must be true that there are correspondences between the operation of the human nervous system and the operation of society, for language is a mediate and mediating instrument of the two. Just as breathing, heartbeat, and digestive tract work harmoniously, so separate men and groups of men move at their own pace in their own tasks in a unified community enterprise. The major integrating mechanism of society is language. Since language is the result of integrated physiological activity and is a means of producing integrated social action, the instrument itself must be integrated.

Because babies of nine to eighteen months of age can use language to communicate with other human beings, language must be a very simple system, or else children could not master it. By the age of three a child speaks independently enough to project his emerging personality. By six he has mastered the code, although his messages — therefore his vocabulary — are limited to his experience. The maturation of a person largely is determined by the extent to which he has acquired usable concepts and the vocabulary with which to express them. A baby enters the world as does an animal; its lifetime work is to escape from animality into personality. A chief means to that end is vocabulary. He becomes an adult as he manipulates — in accord with the mores of his speech community — the abstract values of good and bad, truth and falsehood, utility and inutility, beauty and ugliness, right and left, up and down, and so on throughout an endless chain of contrastive terms, and as he employs his natural and social environment in appropriate ways. A growing command over language is one of society's major requirements of every human being. Only because language is an integrated, simple system can this requirement be made or fulfilled. Only as the agencies of education recognize this fact can they bring their activities into harmony with society's needs and with the principles of language and of language learning.

A disheartening fact of American life is that fully fifty per cent of teenage adolescents are deficient in the use of language. This situation need not exist. No human being willingly wishes to be shut out of language, and no human being, unless he suffers brain lack, is incapable of entering fully into his heritage of language. Deficiency in the use of language is a sign of social immaturity. When high-speed modern instruments are put into the hands of socially immature people, the result can be and is full of accidents and distress. A main source of delinquency, juvenile and adult, is attributable to deficiencies in communication skill. It is obvious that a wholly different approach to language is needed to remedy the present deplorable situation.

Yet society views language with awesome respect. The simultaneous existence of alleged widespread incompetence and of a sense of the great importance of language should lead every thoughtful person to examine the causes. It is here submitted that the basic reason is the continued adherence to outmoded Aristotelian views of language. If society can change its opinion about the motion of celestial bodies and about the feasibility of human travel undersea and into interstellar space, it ought not to be deemed impossible to adopt new insights into language. Thus, though society is a maker of language, at the same time society can prevent progress from being made in the understanding and in the effective use of language.

In accord with advancements in other fields of knowledge, the study of language belongs among the natural sciences, for language is a behavioral science. Both its origin in the human body and its use in society make clear that mentalistic views must be replaced with those that associate language with human physiology, psychology, sociology, and anthropology. A discrete language is a social as well as a personal phenomenon. All people use the instrument essentially in the same way, although they may use different codes and may maneuver their own unique vocabulary. The process is identical. The source is identical. The principles are identical. The purpose is identical. In contrast with these points of likeness, the specific differences between any two tongues are comparatively slight.

In summary, then, the following principles may be stated:

1. Language has a necessary quality of fixity.
2. The fixity in language is found primarily in the code.
3. A stimulus to use the vocabulary of a language activates the code.
5. Language is a simple system, or children could not use it.
6. No person not handicapped by brain lack is incapable of attaining mastery of a language.
7. A growing command over language is one of society's major requirements of every human being.

8. A new scientific view of language is needed by the public.
9. All languages operate by identical methods of production for identical purposes.

III

A DEFINITION OF LANGUAGE

The portion of the speech process which we are studying relates to produced language sounds after they have emerged from the speech tract. We want to describe, measure, and count all the elements that can be discovered in a stretch of uttered language that contains every possible manifestation of the system. In this analysis it becomes apparent that the vocabulary is seemingly endless, as is the expanding universe that constantly demands new words, but that the code is limited like a finite-state machine. The analogy with the nervous system again is apt. The mode of communication from receptor cell to effector cell probably has not altered in man since his appearance on earth a million or so years ago. Yet his broadened experience has caused this communication system to carry new messages in the old code. The existence of this code has a meaning to the human body; that meaning relates to the principle of homeostasis, the inbuilt self-stabilizing ability of the body. Similarly the meaning of the language code is related to the principle of stability in society. Because our primary purpose is descriptive, we shall defer the topic of code meaning until the existence of the code has been established empirically.

The first step in understanding the concept of code must be taken in relation to the existence of some three thousand discrete languages. Since each of these languages emerges from identically constituted (if slightly differently shaped) physiological mechanisms, there must be a basic message-making system analogous to the communication system of the nervous system. The concept of system within system, familiar in modern industrial organizations, applies to the human body and to language. It is possible to postulate, therefore, that there exists a universally identical primary system of signal-making that gives rise to a code. This universal code has not hitherto been identified, because the study of language has rarely touched this area of the speech process. Only by examining representative languages in every so-called family of languages can a scientific answer be achieved. The nearest approach to an answer thus far has been the International Phonetic Alphabet, but the IPA is a chart of sounds only and not of the mechanism or code by means of which these sounds become maneuverable symbols in a discrete language in the basic structure called a sentence.

The principle of system within system makes it possible, further, to postulate the existence of a unique code in every individual speaker. It need not be argued that individual speakers, by their intelligible communication with each other, are using a speech-community or discrete-language code like English, French, or Japanese. Researchers are beginning to identify discrete-language codes, and on the basis of these analyses to establish as fact the existence of personal codes within a larger, community-wide code. What is now needed is more work in many languages to "break the code" underlying all speech.

The duty of the linguistic scientist is to abstract those elements which form the minimum operating machinery and to formulate a symbolic model whereby they can be examined without reference to any message that the code may carry. In short, the discovery must be made of that part of language which constitutes the mechanism as it lies latent and potential in the mind. If it is true that a stimulus to use vocabulary activates the code, then the distinction between the items called code and the items called vocabulary must be of paramount importance in this analysis. The problem of differentiating these two elements was solved only within the past decade. The fullest explanation was given by Donald J. Lloyd and Harry R. Warfel in *American English in Its Cultural Setting* (1956). Some sounds and words belong primarily to the code, and they are also bearers of lexical meaning. For example, the final s on a noun, as in *boy's, boys, boys,'* is both an item in the code and a bearer of the lexical meanings, respectively, of "of one," "more than one," and "of more than one." In a sense, *boy, boy's, boys,* and *boys'* are four different words. But the systematic use of the *-s* on all nouns makes it an item of the machinery of English, and it must so be viewed. In speech this written *-s* has three forms, as in *boys* (a *z* sound), in *houses* (*i* plus *z*), and in *rains* (an *s*). Systematic differences of this kind between the codes of speech and writing cause the linguistic scientist to ask that all language phenomena be dealt with in relation to speech. Writing in some respects is a poor surrogate for speech.

A few more matters must be clarified. The factor of distance between speaker and hearer, while of some significance in the total process of language and of great importance in telephony, is of no importance to a theory of language structure, and hence this topic can be omitted in this book. Likewise the subject of aural reception of language signals, though fundamental to the process, is not dealt with. The physiological acts in the production of speech have been described by others so thoroughly that there is no need to repeat this information here. Finally, although references are made to a few other languages, the basic data of this book concern the English language.

We are now in a position to define language in such a way that the statement will apply to English or to any one of the other three thousand or so identified tongues.

Language is a structured system of overt, learned and therefore non-instinctive, sequentially produced, voluntary, human, symbol-carrying vocal sounds by which communication is carried on between two or more persons.

There are ten terms in our definition of language: (1) structured system, (2) overt, (3) learned, (4) sequentially produced, (5) voluntary, (6) human, (7) symbol-carrying, (8) vocal, (9) sounds, and (10) communication. The basic aggregate of terms is sometimes given as "a system of human vocal sounds," but such a broad definition would include singing, laughing, weeping, whistling, stertorous breathing, snoring, wheezing, coughing, sighing, and groaning when these actions, though systematic and habitual, are not accomplished in connection with symbol-carrying sequences of the distinctive vocal sounds in a discrete language system. The human voice can produce meaningless noise as well as language, music, and other systematic meaning-carrying sounds. For our purposes all forms of vocal sound that do not possess the ten characteristics named above must be eliminated from consideration. A few words about each term may be helpful.

(1) *structured system.* A system is a coherent arrangement of interrelated parts into a unified whole that makes possible the repetition of the same events or actions. Speech is produced by identically organized parts of human bodies; hence speech results from the repeated activity of a structured finite-state physiological mechanism or system. The code of any discrete language consists of a set of segmental phonemes, of intonational patterns, of code morphemes, and of syntactical structures.

(2) *overt.* Language must be observable as an acoustic manifestation. It must emerge from the mouth.

(3) *learned and therefore non-instinctive.* By contrast with other animals, man has few instinctive sounds. A child or new speaker of a non-native tongue must acquire language as a set of habit patterns.

(4) *sequentially produced.* The human speech tract makes one sound at a time, so that speech emerges as a stream of sound. A page of print, which has analogies with a drawing, gives at first glance a false view of language as a kind of completed, permanent totality. Speech departs from the mouth one sound at a time and disappears forever unless recorded.

(5) *voluntary.* Speech production occurs only when a stimulus calls it forth and when the human will permits utterance. A normal state of all animals, including man, is silence. Some human beings, especially babies and elderly persons, babble much, but this action is stimulated and not automatic.

(6) *human.* The limiting word *human* avoids controversy about parrots, dogs, and other animals that maneuver voiced sounds in limited ways.

(7) *symbol-carrying.* An essential element in language

is the maneuverability of the vocabulary in the code, so that "words" are not merely surrogates of single experiences or classes of experience but by metaphoric, imagistic, and ironic employment may also take on an endless variety of meanings.

(8) *vocal.* The sounds of language result from the manipulation of the speech tract in relation to exhaling air. Clicks of teeth and similarly produced sounds of the lips, wherever they occur systematically as part of symbol-carrying utterance, can be deemed elements in the structured system of language.

(9) *sounds.* The general word *sounds* is employed to avoid the technical term *phonemes,* which might be more appropriate.

(10) *communication.* Speech apparently was not in its origin a private manifestation, nor can language be learned apart from another speaker. The purpose of language is to transmit messages from one person to another; hence it is a communication system.

CHAPTER II

LANGUAGE IS A COMMUNICATION SYSTEM

Language is a communication system. Language is only one method of transmitting organized, meaningful signals from one person to another. Dancing, drawing, music, and pantomime are other organized ways of expressing ideas and emotions. Laughter, sobbing, and panting, though communicative, are less well organized. These non-language modes of message-sending often accompany or occasionally replace language; they serve as adjuncts to vocal utterance rather than as independent systems. Gestures replace speech when noise or distance prevents hearing; gestures, dance steps, pantomime, and music (a sung or whistled sound or sequence, for example) express emotional responses. In the total human communication process they merit consideration, but they are not languages in our sense of the term. A language is a set of overt human vocal signals that are organized on a systematic basis, that are made voluntarily and non-instinctively, and that operate as symbols. Yet the distinguished anthropologist, Edward T. Hall, has written brilliantly of ten structured "primary message systems" arising from bodily behavior in *The Silent Language* (1959); this book, which can serve as a companion to the present work, is recommended to all readers who are interested in human behavior.

The easiest way to understand the successive steps of the language process is to imagine two persons at a distance from each other in a dark room. The situation is much like that of a telephone conversation. Neither can see or touch the other, so that the only signals that can be transmitted are sounds. If we rule that stomping, finger drumming, laughter, sobbing, and panting are accompaniments to language, then the procedures of speech transmission are like those of a telephone. Eight parallels exist between the elements in a language situation and those in a mechanical telephone operation. Both language and the telephone must have (1) a power source, (2) a sender with (3) a message and (4) a code, (5) a mechanical transmitter, (6) a channel, (7) a mechanical decoder, and (8) a receiver.

I

THE POWER SOURCE

The power source of language is the human nervous system. The gray matter or cortex of the brain contains the power cells. The white matter is a set of microscopically small wire-like threads that connect related parts of the brain and that carry electric impulses to muscles and organs. Each area of the cortex has special duties. The major speech centers are the posterior temporoparietal area and Broca's convolution on the left lobe of the cerebrum. These speech centers, acting like a set of punched cards, store phonemes, sentence patterns, syntactic structures, words, and ideas. In the act of speech these cells send impulses to the motor areas that control muscular movements in all parts of the body. The cells in the motor areas combine to complete computer-like operations. Every uttered syllable results from a combination of rapidly made muscular contractions and releases. The speech process involves muscles in half the body. The diaphragm pumps the lungs, the lungs move air through the wind pipe, the vocal cords open and close, and the soft palate, tongue, jaws, lips, and nostrils move. Dozens of muscles perform their duties simultaneously in an integrated activity to give the proper quality and force to a sound or sequence of sounds.

A baby begins to store sounds at birth and maybe even before birth. As he matures he makes noises in imitation of those that he hears. His cooing picks up the intonational patterns of speech. At about nine months he begins to make distinct language sounds, and soon he masters some of the sounds and some of the words. Every normal child will enter into language quite rapidly after the first distinct speech sounds are made. Always he uses the proper order of words in the code he hears. His babbling is like practice by an older person on a musical instrument; it is his way of mastering the system. The net effect of hearing and talk is to fill the speech center with items for future use. A human being's whole life is devoted to this process of storing and using. What he does from the age of two to six is likely to establish the sound system of his native language so firmly that he will never deviate from it. People who have not seen each other for thirty years can still recognize each other's voices over a telephone.

The exact manner in which the same sounds and the same words are put into the same places in the brain is not known. The process of storing the sounds and then releasing the impulses to make the sound while retaining the stored experience has a parallel in complicated electronic computers. Students of the nervous system are coming closer and closer to an explanation. The only mystery in language lies at this point in the power system. All else about language production is quite understandable as manifestations paralleling other parts of nature. From the making of vocal sounds to the intake of sounds on a human receiver's ear all events are as systematic as are the movements of the heavenly bodies. What happens inside the brain of the sender and of the receiver remains something of a mystery. How the information stays in the speech center during the process of cell renewal adds to the marvelousness of the brain's operation. Still, it is demonstrable that every unharmed brain can amass and release the signals of not only one language but of many languages. A child can learn two or more languages and never confuse them. He can pass back and forth from one to another. He can mix them by using items from the vocabulary of one in the syntax of another. He can use language all his waking moments and even in his dreams; yet, interestingly enough, he does not wear out but rather strengthens his command over speech. He can never lose his language except by harm to the nervous system or by death.

The power that lies in the nervous system is of a different character from the electricity in a telephone system. Although we cannot define the nature of human mental power, we can be sure of its existence and simply take for granted that every human being has his share of it. It is necessary to note, also, that language involves one power source for the transmitter and another for the receiver. Although a difference in the relative strength of the two power sources may cause difficulty in the transmission and/or reception of a message, we need not enter upon a discussion of this matter. Like a telephone system, at any point in the system there can be weaknesses and noises that disturb the clarity of the signals.

A special quality of the nervous system as a power source is that it can formulate messages, choose the discrete-language code in which the messages shall be sent, and energize the speech tract to transmit the appropriate signals. At the same moment it can order other parts of the body to engage in activities like walking wholly unrelated to language-making. Language is a set of actions that result from a much more complex source than the electricity which powers a telephone system.

II

LANGUAGE IS VOLUNTARY BEHAVIOR

A sender must will to make a language message. Just as a person must engage in the physical act of manipulating a telephone instrument, so a speaker must voluntarily start the language process. There is no necessity to speak as there is to breathe or eat. Many persons have taken a vow of silence and have fulfilled that vow faithfully during many years. This is not to say that they have surrendered the use of language; they could not do so and easily remain human. Their actions have been built around the language system of which they are a part. They have substituted for language a system of gestures, all of which are easily interpreted.

The voluntary nature of language utterance appears most sharply defined in the refusal of little children to speak when requested or in the silence of older persons when asked questions whose answers they know. Babbling is a willed act, whether it is performed by a child or a dotard. Any language can exist, therefore, only as long as people will speak it. A language dies when lips cease to utter it.

III

FRAMING A MESSAGE

The language message which a sender determines to issue begins as a vague formulation in the nervous system. The desire to speak begins with an impulse, intention, excitement, inclination, or compulsion. No word necessarily has been chosen. Just as painters and musicians can complete compositions without using a word, so any person can formulate an idea or message without ever using a word. After the first word is spoken, no one really knows what the next or the tenth word ahead is going to be. Often a sender regrets the words that he has uttered or amends them or makes an alternative statement. The sender's planned message is not necessarily the one which eventuates in language. It is necessary, therefore, to examine the intervening steps between the formulation of the message idea in a sender's mind and the reception of a language statement by a receiving mind.

IV

CHOOSING THE CODE

A language message must be framed in a particular code. If the vague idea in a sender's mind is "Do you speak English?", the sender must decide whether to say "Sprechen Sie Englisch?", "Parlez vous anglais?", "Habla usted inglés?", "Parla inglése?", or any one of the other 2,793 identified codes. The idea is identical in English, German, French, Spanish, and Italian, as well as in other languages. What is different is the code. That is, the vocal signals in each instance must work together as a system. This system, or a part of it, must pre-exist as stored experience in the nervous system before the motor cells can order the muscles of the speech tract to make these signals. The intonation patterns of any language seldom are correct unless the speaker has previously heard those sounds. A high degree of inaccuracy is likely to result when a person tries to teach himself to speak a language by reading a book. He needs phonograph records or tape recordings to fill his speech center with the proper sounds. If he has not heard the code he wants to use, he will use the sound signals of his native language. The result is "broken English" or its equivalent.

The act of choosing and using the code sets the speech tract into operation, so that there are simultaneous acts going on. The speech area of the brain frames the message in the code and orders the motor area to tell the muscles to perform. When writing replaces speech, the muscles of the arm and fingers work, and usually the speech tract also performs some movements even when sounds are not made. Since writing is a substitute for speech, children usually, and some adults also, say aloud what they are writing.

It may be well to pause a moment to note that the code is an instrument, a means of doing something. The code is mediate; it stands between the mind and the action which the mind wishes performed. Like any other instrument it is limited in what it can do, it is changeless in its basic structure, and it can be used again and again. It is limited because it must use vocal sounds; it is changeless in its basic structure, because all people speaking the same code must use the same signals; it is capable of being used again and again, because no single message or any quantity of messages will wear out or even change the code. In a sense a code is like a typewriter that is given to a child; the keys on a much used yet well-cared for machine will last as long as human life. This code usually remains almost unchanged during a persons's lifetime.

The average person does not know the nature of his language code. He uses this instrument in much the same way that he walks. Somehow he learned its manipulation; what it is and how he makes it work are seldom of interest to him. Had there been great curiosity about the phenomena of speech, so many hundreds of languages would not remain unwritten and unstudied. The active hostility of many students to a program of language analysis merely continues an age-old attitude. The study of language is a sign of a highly advanced stage of culture.

The code of English speech has, as its basic units, thirty-three segmental phonemes and twelve suprasegmental phonemes. Other languages have as few as thirteen segmental phonemes and possibly as many as forty-five. These individual sounds have no meaning, and they combine into larger units called morphemes, words, and utterances that take on the meanings which the system and the society which uses the system give them.

A code of writing is derived from a speech code. Alphabetic letters are analogous to segmental phonemes; by themselves they have no meaning. In a way, initial capital letters in sentences, as well as punctuation marks, reflect some of the work of suprasegmental phonemes. Words are comprised of morphemes, and sentences are parallel to utterances. This comparison merely points up the great differences between the two codes. Yet there are interesting points of similarity.

V

THE SPEECH TRACT AS TRANSMITTER

The transmitter of the language code is the speech tract. The speech tract is that area of the chest, throat, and head which engages in the process of making vocal sounds. There are many vocal sounds which are merely noise, so that a distinction must be made between the sounds in and not in the code. Musical tones, for example, as well as sobbing, coughing, snorting, wheezing, can be made either without reference to language sounds or in conjunction with speech. Whispering is a manner of making speech sounds without utilizing the vocal cords. The actions of the speech tract are numerous and varied; the primary concern here is with the speech tract as the transmitter of the speech code.

The speech tract includes the whole area of the diaphragm, lungs, larynx, vocal cords, mouth, and nose. The muscles which maneuver these body parts are of great importance, because they develop, among other things, the habit patterns necessary for speech production. The tongue plays such an important role in speech production that the word *tongue* is a synonym for the word *language*. Yet every fiber of the speech tract plays a role. Because our major interest is in the system of the code, there will be no attempt to discourse upon the physiology of the speech tract or to explain how the separate sounds are made.

The coding activity of the speech tract is opposite from that of a telephone transmitter. The telephone transmitter converts sounds into a code composed of electrical impulses that can be decoded and reconstituted into speech sounds by a mechanical instrument called a receiver. The speech tract encodes into speech sounds the electrical impulses given by the motor cells but started by the brain's speech areas. At the receiver's end the sounds are converted into electrical impulses by the human auditory system and sent into the brain. The great point of similarity is that both are capable of handling all human speech sounds and all languages. The overwhelming difference is that the average person's speech tract normally produces only one code because he knows only one.

The code employed by any speaker is the result of several causes. He knows and uses the code which was thrust on him at birth by his environment. His native language was an inheritance; he never had a chance to choose it as he can choose to learn other codes. Because habit has led to his use of one language, he may find it difficult to achieve a similar proficiency in others. His particular sounds are a result of the cumulation of experience in his speech community. He has not heard some language sounds, and of course he had not made them. The older he is, the more difficult he finds the task of learning new sounds, not because they are difficult but because he wants to transmit messages before he has mastered the code. Thousands of immigrants to the United States live amidst American speech and yet never produce American sounds. They translate what they hear into their own code and consequently are astonished, if not annoyed, at the suggestion that their speech has an "accent."

The fault with speakers of "broken American English" lies in their failure to train the speech tract to transmit the sounds which their native friends make. Any one who can hear speech sounds can make them. It takes practice, the kind of practice which babbling babies indulge in, and it requires an attitude of willingness to master the code. No amount of talk about the right way will help; practice must be so rigorous and continuous that the brain's speech centers order the new speech sounds to come as naturally as do the old ones. Each code has its own tempo, rhythms, and melodic or intonational patterns. The speech tract can produce them effortlessly for any language if sufficient training is engaged in.

VI

THE MESSAGE

The message that is sent by the transmitter depends upon the vocabulary that is fitted into the code. The code is like a clarinet; it is an instrument that is ready to serve. Whether it plays a good tune or a poor one depends not on the material it is made of but on the musical score assigned to it and the skill of the player. So the words put into the code, as well as the skill of the speaker, determine the content and the quality of the message. As was seen above, the word for *English* in four European languages is shaped by each of these systems and not by its origin. Any noun that comes into English must take the plural form demanded by our system of adding *-s* to the singular or base form. As soon as it is noted that vocabulary follows the rules of the code, it will become apparent that the code is of primary importance. This view of language is easy to accept if it is tested by an analogy like the clarinet versus the musical score.

We shall see that in every way the vocabulary of a language operates by principles harmonious with those of the code. At the moment it is sufficient to say that the code is the instrument which makes it possible for vocabulary to transmit meanings. A separate chapter will deal with the way the vocabulary works in the code.

VII

THE CHANNEL AND THE RECEIVER

The channel through which speech passes to a human receiver is the atmosphere. There are so many varying conditions of quiet and storm, of rain and snow, of oppressive heat and freezing cold that numerous problems arise in communicating across even a small air space. Again, although the possible events related to the channel are of no small interest, the description of them and of the difficulties that a receiver may experience will not be taken up here. The noises on the channel and the noises and other disturbing factors that affect a receiver do not directly have an influence on the nature of the code, the subject of this book.

The synopsis of a telephone system has provided a symbolic model for the analysis of the important elements in the communication system called language. The power source (central nervous system) and the transmitting apparatus (the speech tract), the channel, and the receiver are of great importance. But the code and the vocabulary are of chief interest to us.

CHAPTER III

THE ORIGIN OF LANGUAGE

A new theory of the origin of language can now be formulated. The existence of an extra portion of brain in man suggests that language must have arisen in the early decades of human history about a million years ago. The similarity in the method of production and in the principles of operation of all languages, despite the differences in the basic phonemic elements, suggests that a generalized theory of origin can be based upon currently observable data.

I

SOUNDS AND WORDS

The initial premise, as stated by M. M. Lewis in *How Children Learn to Speak* (1957), is that the "first cries of a child . . . are the same all over the world, wherever the child may be born" (p. 15). These sounds include *ah, o, oo,* vowel sounds that occur in nearly every language. Lying on his back, a baby adds guttural consonants as in *ga, ka;* prone, he adds labial consonants like *ba, pa,* nasals like *ma, na,* and dentals like *da, ta.* The vowels also can be the *ee* in *seen,* and *ay* in *day* in all these combinations. Long before a child uses language, as we have defined the term, he is engaged in making sounds that will later become segmental phonemes. Thus his every vocal sound exercises his speech tract and gives it the necessary muscular experience to form habits of production. The shape that the production will take is determined by the responses of his parents or caretakers and by the systematic language sounds uttered in his presence. It can be postulated, therefore, that the phonemes of every language derive, in part at least, from the first vocal sounds made by a child.

The inventors of language doubtless discovered the large variety of sounds which they could make in contrast with the limited vocal sounds uttered by animals. They probably noticed their ability to will the production of sounds of their own choosing. Some sounds were made habitually, and to some of these sounds these people attached meanings. Thus the frequency of infants' *ba . . . ba . . . ba* could have led to a primitive form of our *baby, ma . . . ma . . . ma* to our *mama, da . . . da . . . da* to our *daddy,* and so on. The first step in the creation of language, therefore, had been taken, for vocal sounds became surrogates of physical objects. The habitual use of these individual combinations in proper context made them intelligible to members of families and then to the clan.

The first or naming step in language led to the creation of a large number of nouns. That nouns came first seems a tenable hypothesis, because at least eight-five percent of the base-form vocabulary of every language comprises nouns. Names of physical things probably were created first and in largest quantity; later were added the names for abstractions like *hope, love, truth,* and *beauty.* To a large degree and possibly for a long time, mankind engaged in the naming activity, much as children babble, for the sheer joy of the exercise. How many concepts may have been developed is an open question. But once the method became commonplace, it was a comparatively easy act to create *tree, dog, cat, cave, grass, sky, cloud, rain, sun, moon.* It is not necessary to postulate that all nouns were monosyllabic, but it is possible to believe that dissyllabic nouns came into being slowly by reduplication, as in *mama,* or by combination, as in *sunshine.*

II

THE BASIC SENTENCE

The most important step in language history occurred when one noun was put into action in relation with another, as in

N	V	N
Mama	holds	baby.
Cow	gives	milk.

The invention of the verb led also to the invention of the basic statement-sentence pattern, man's most important instrument in his onward advancement. With the sentence he was able to express the facts and conditions of outward nature and of inward feelings and thoughts. The structure of modern languages suggests that the NVN pattern was the earliest and, possibly for a long time, the only sentence. All else that exists in the operating formulas of language arose from modifications of this basic sentence. Advances in syntax came slowly, for in English there have been no changes in syntax since the year 1550. Certain methods and principles have gained or lost favor, and old words perform new duties. Thus the recent use of *got* in "We got acquainted" is merely a vocabulary substitution for *became* and is not a new operating technique. Words come and go in language, but the structure of a modern language remains almost unalterable.

The first enlargement of the basic sentence pattern probably came from the invention of adjectives, the qualifiers of nouns, as in

A	N	V	A	N
Large	man	holds	small	baby.
Wild	beast	kills	tame	dog.

It may be that compound nouns, like *grassblade, doghair, horsehide,* paved the way for this expansion of the additive principle that underlies language operation. Whatever the reason, a new reach was given to man's thought processes.

Similarly the adverb came into being to qualify the verb with the formulation of such concepts as *now, here, there, then, soon.*

N	V	N	Av
Man	holds	baby	now.
Dog	chases	cat	there.

With the invention of the four major word-classes and the assignment of positions to them in the sentence pattern, primitive man had a flexible instrument for communicating facts and knowledge, opinions and feelings, and for giving stimuli and expressing responses. It matters not whether he had the words used in the sample sentences above; what does matter is that he had created a vocal communication system whereby members of these four word-classes could shuttle in and out of their appropriate positions to achieve an intelligible exchange of concepts.

Because primitive people today do not analyze their languages, it may be postulated that the invention of further grammatical ideas occurred fortuitiously and that these new devices were adopted more as matters of habit than of intellectual decision. Thus there must have arisen fairly early a distinction between one and more than one so that concepts of singular and plural, as in *boy, boys,* and *dog, dogs,* fell into place without debate. Agreement in number between the subject and predicate likewise may have resulted from a primitive sense of logic. In similar fashion, special endings were assigned to the nouns in the direct object position; in English this principle survives only in the personal pronouns. The addition of a concept of time to the verb may have been so frequent that the speakers of some languages built conjugations for tense by merely coalescing verb and adverb, much as we do in nouns like *tossup* and *pickup.*

Since nouns are the surrogates of things, it was an easy step to substitute pronouns for nouns. Concepts of person, of *I* the speaker as opposed to *you* the listener and *it* the thing talked about, could have entered language quite early. The indefinite pronouns, like *some, any, many,* probably came at the same time as the concepts of mathematical number. From mathematics also may have come the concept of *be* as a sign of equivalence between nouns. The subordination of one sentence to another, as in "Dogs warn tenants when strangers enter caves" and "Men who love children own dogs," resulted probably from another leap forward in man's logical powers. The additive principle provided for apposition and compounding. The prepositions doubtless grew out of the adverb, for most of them in English still retain their adverbial powers. The indefinite articles *a* and *an* are derived from the number *one;* the definite article may be a reduced form of the demonstrative, as in English *the, this;* German *der, dieser.*

Other sentence patterns than N V N were created by three devices. The question sentence resulted from a shift in the intonational pattern, as in "I grow potatoes" and "I grow potatoes?" A second method involved shifting the verb to a position before the subject, as in "Gave he reasons?", so that the order became V N_1 N_2. The third device involved omitting the second N or both the first and second N. The omission of the second N (or mathematically the use of zero as a member of the group or word-class that works in any position) gives the pattern N V or N V O (O represents zero), the intransitive sentence, as in

N	V	N
Dogs	bark.	
Jesus	wept.	

as contrasted with

Dogs	bark	warnings.
Jesus	wept	tears.

The imperative sentence has the pattern V or O V O, as in

N	V	N
	Halt.	
	Decide.	

as contrasted with

You halt your steps.
You decide the issue.

The total number of operating devices in any language is comparatively small. Nearly all of them were invented in prehistoric times. The differences among languages result from the segmental phonemes, the intonational patterns, and the degree with which some grammatical ideas are exploited and others are not. The simplicity of any language system arises from the small number of formulas which give variety to the basic structure. If it is true that all languages have the N V N sentence pattern as the basic structure, then the operations of language must revolve around these three elemental positions. The few operations are guided by a few principles of modification, word order, function order, apposition, compounding, inflection, and functionality. In relation to the vast vocabularly of English, the fifty or so operations make the language system very simple. This simplicity results from the limits put upon language by its original sentence pattern.

III

MATHEMATICAL PRINCIPLES IN LANGUAGE

The system of language operates according to mathematical principles. Any system must embody a small set of related elements that work together harmoniously according to rules. The same actions must occur repeatedly. No matter how different the components are in size, shape, and complexity, the procedures and the principles are the same. A big store, despite its many departments, carries on its business in the same way as a little store. It buys and sells. A long sentence operates according to the same fundamental rules as does a short one. As any system enlarges, it develops new devices, but these must reflect principles that are in harmony with the original ones. The invention of pronouns, for example, followed the principle that words are surrogates; pronouns are merely surrogates of nouns.

Inherent in the organization of a sentence is the idea that a word-class occupies a particular position. The term *position*, therefore, must be understood to be like a point on a line in mathematics. A mathematical point is a center of activity rather than a specific physical space. Just as the size of a word, whether *a* or *antidisestablishmentarianism,* is an unimportant characteristic in filling a position, so the size of the position is not a consideration of importance. Any position in a sentence may be filled by one word or by two or more. The positions taken by the four major word-classes may be filled by extensive aggregates. The principle is illustrated in the parallel between $1 + 1 = 2$ and $.7543 + .2457 = 1$. Each position is a point that puts no limit upon the appropriate items that fill it.

There are two positions in a basic sentence like "Birds fly," three in "Man invented language" and "Roger is captain," and four in "Fathers give sons advice." These positions are filled by nouns and verbs. Adjectives have positions in relation to nouns, and adverbs have positions in relation to verbs, as in "Good boys work diligently." From the ordinary point of view there are four words and four positions in that last illustrative sentence. From the mathematical point of view of this book it is possible to see two positions. "Good boys" fills the noun position, and "work diligently" fills the verb position, because each pair of words constitutes a unit and because *good* and *diligently* could not serve alone in the way that *boys* and *work* do. The important idea to grasp, therefore, is that the centers of activity in sentences are, first of all, nouns and verbs. The secondary centers of activity are the adjectives and adverbs. The adverb also takes a tertiary position as a modifier of adjectives and other adverbs. The power of these positions to unite and form aggregates is significant. Because the adjective and adverb also have primary positions, as in "John is *studious*" and "John is *here*," the concept of hierarchy is valuable in describing the positions taken by the word-classes.

As soon as the structure-word *the* is placed before *boy* or *good boy*, as in "the boy" and "the good boy," the mathematical principle of a well-ordered set is seen to underlie the grouping of words. The relative positions of *the* and *boy* can never change; their sequence is unalterable. They are fixed points in an expansible group; any number of adjectives or adjective groups can stand between *the* and *boy*, as in "The very good prettily dressed little boy." No small part of the fixity of the system of English results from the well-ordered nature of word-groups. Most printed words, of course, are formed by the principle of permutation as it appears with alphabetic letters, as in *seat*, *teas*, and *eats*. Well-ordered words result from prefixes, as in *redeal*, *reseat*, and *resell*, and from suffixes, as in *dealer*, *seater*, and *seller*.

The overriding mathematical principle in language is functionality. Functionality denotes the power of a position to be filled by a constant and by variables. The old concept of functional change must be enlarged. Traditional grammar shows that English provides for the members of other word-classes to serve in the noun position, as in "The *weak* suffer" and "The *ins* ridicule the *outs.*" A similar movement occurs in the verb, adjective, and adverb positions, as in "The man *paled*" and "He went *Wednesday.*" Word-groups also serve in the four positions, so that the operations of language seem highly complex. Yet lying behind these intricately interwoven maneuvers are principles that keep the system orderly and simple.

In this discussion of the mathematical principles of language, the term *mathematics* is not to be conceived in relation to concepts of measurable quantity. Rather, the principles serve to provide a framework in which operations can be abstracted without reference either to specific morphemes (or words) or to the number of units in the acoustic (or graphic) spans comprising an utterance (or sentence). A mathematical notation of the basic sentence, N V N, is qualitative, for each sign indicates the word-class constant and the total set of variables that can fill that position under appropriate conditions. The sequence N V N is a symbolic model analogous to the benzene ring in that it presents in visual form a structural arrangement.

CHAPTER IV

THE CODE OF ENGLISH

I

ELUSIVE PHONEMES AND MORPHEMES

The mechanism of the speech tract is like that of a loom. A weaving machine makes essentially the same movements in a variety of combinations as it shuttles threads of various sizes, colors, and weight. The machine is the same, the threads are new and limited in number but adapted to the machine, and the result is a new fabric. Thus the speech tract retains the same integrated set of parts throughout a person's lifetime. The segmental phonemes created by the exhaling breath stream are forever new, analogously must be few in number, and are those which only the speech tract can make. The limited nature of the processes of weaving and speaking suggests that the small code of the loom is paralleled by an equally small code in the speech tract.

The speech tract really is a sound-making apparatus like an oboe or clarinet. The vocal cords are similar to the double reed in an oboe; the mouth and nostrils form a three-holed bell end of the instrument, so that an effect can be achieved similar to the muting of a cornet. The variability in size of the air channels and resonance chambers — especially the mouth and nostrils — has a parallel in the valves on some brass instruments. Yet the speech tract is only fifteen or twenty inches long; the lower half is the diaphragm and lung chamber, and the upper half is the sound-making and resonance part. Thus the length of the whole speech tract approximates that of an e-flat clarinet, and the producing end is the size of a very small military bugle.

The number of distinctive notes possible on so small an instrument is few, so that human physiology leads us to search for the principles by which the phonemes are produced; we want to see if they are also few in number. The fullest explanation, and probably the right one, has been given by George L. Trager and Henry Lee Smith, Jr., professors of anthropology and linguistics at the University of Buffalo, in *An Outline of English Structure* (1951). Building on the theory of Leonard Bloomfield in *Language* (1933) that phonemes are made in particular places in the mouth and that variants or allophones take shape near this position, Trager and Smith demonstrated that the mathematical theory of functionality applies to phoneme production. The position is a function, the constant is the usual or normal sound made in that position, and the allophones are the variables. The mouth cavity was divided into nine segments for English vowels. Speak aloud in varied sequence the following sample words, and notice the pitch of the vowels.

	FRONT	CENTRAL	BACK
HIGH	bit	jis'	boot
MID	bet	but	boat
LOW	bat	hot	bought

It was discovered that individual speakers use the same number of sounds in any discrete language and that, whether phonemes or allophones in respect to the usage of their speech community, these sounds are produced systematically. Hence a speaker is partly identifiable by his set of sounds and also partly by the timbre of his voice. The total number of 33 minimal segmental phonemes in English comprises 9 vowels, 21 consonants, and 3 semivowels (*h*, *w*, and *y*). In the normal enunciation of speech there is also a set of 12 suprasegmental phonemes: 4 levels of pitch, 4 degrees of stress or accent or loudness, and 4 lengths of pause or juncture between phonemes, morphemes, word linkages, and utterances or sentences. Thus there are 45 phonemes in English. All that can be said in the language results from combinations of these 45 phonemes, just as all that can be written can be transliterated into 26 alphabetic letters, a unit of space, and 12 punctuation marks, a total of 39. A principle of simplicity, therefore, underlies speech production, for phonemes and allophones are not unlike the sounds made by variously pitched instruments. There is nothing very strange about these variables except, possibly, the long ages it took to discover nature's secret.

It should be possible to proceed to establish the coded basis of the operations of the speech tract, but no satisfactory theory has been announced. For this reason we shall drop the subject of phonemes and move on to morphemes.

Morphemes, as said earlier, are minimal units in the code and in the lexicon. A morpheme like *a* in "a book" is both a code and a lexical item, whereas *book* is a lexical item on one level and a filler of the sentence code as N in another. Morphemes introduce complications into analysis, because morphemes are more often etymologically determined isolates of meaning than units of structure. Since our structural analysis seeks to escape from meaning-oriented procedures, the concept of morpheme is less useful than the concept of word. Furthermore, speech scientists have not differentiated the areas and levels of morphemic code operation. We must move forward without completing this topic.

If we want to find codes of phonemic and morphemic structure, what can we do to find some entry into this subject? The answer lies in the gross anatomy, the shape and bone structure, of language. These are the types of materials that biologists like Linnaeus and John Hunter began with in the classification of plants and animals. Like them we may be wrong in our analysis, but a start must be made somewhere. If we are wrong, our errors may give impetus to someone else to formulate a correct theory.

II

THE PRIMARY CODE

Everybody apparently knows what a sentence is, and yet no one has been able to write an acceptable definition of this basic structure in language. It would be better for our thesis if a definition would be possible. The old definition that "a sentence is the expression of a complete thought" is wrongly oriented; its terms of reference relate to the message and not to the systematic production of sounds. A sentence is a produced entity, like a segment of cloth, in the total fabric of utterance. The sentence formula lies latent and potential in the mind, just as the shuttling motion does in a loom. The stimulus that activates the production of sentences arises from the desire to put vocabulary — as the loom does threads — into the operations of the mechanism. Thus, while the message as the end-result is of social interest, the process chiefly interests the technologist. Hence the linguistic scientist says that he wants to know how the speech-making machine operates.

In our present state of knowledge we must work backward. We must take the finished product and, avoiding the meaning in the message, see what operations were necessary to produce the fabric. Every type of utterance must be brought under examination, because the great value of vocabulary — as of varied threads in weaving — is to see the scope of the mechanism's operations. It is the same in printing, milling, die stamping, and other operations of fixed-state machines. The substance that permits a machine to fulfill its duty or purpose in no way determines the machine's basic operating principles; the varied sizes and qualities of processed substances show the scope of activity and clarify the extent to which adjustments are possible. The difference between principles of operation and principles of minor adjustments is of paramount significance; yet, until the last decade, linguistic scientists scrutinized minor adjustments, as with the past tense forms in "I *saw,*" "I *seed,*" and "I *seen,*" but missed the underlying principles of language operation.

The method of analysis is as follows. Sentences are juxtaposed to see what is happening. Sentences of like type are examined to see what adjustments are possible in each position. Then the units in each sentence type are dissected until every known manifestation has been identified. The first conclusion that can be drawn from a study of thousands of sentences is that there are now in use five basic statement-sentence patterns. In these sentences each function is filled by one member of a word-class or, as in passive verbs, one minimal unit of two words.

1.

N	V	N	V
Men	sing.	John	was named.
Women	pray.	Horses	were sold.
Jesus	wept.	Evidence	was gathered.

2.

N	V	A
Corn	turns	yellow.
Hope	springs	eternal.
Doors	bang	shut.
Mary	is	absent.

3.

N	V	Av
Spring	is	here.
John	backed	down.
Bears	are traced	down.

4.

N	V	N
Life	has	duties.
Mosquitoes	carry	disease.
Haste	makes	waste.
John	is	captain.
Rusk	was named	secretary.
John	was given	presents.

5.

N	V	N	N
Kennedy	named	Rusk	secretary.
Mary	gave	John	presents.

Another classification is possible by differentiating the verbs.

COPULATIVE

I. (a)

N	LV	N
Men	are	soldiers.
I	am	he.

(b)

N	LV	A
Labor	is	tedious.

(c)

N	LV	Av
John	was	upstairs.

INTRANSITIVE

II. (a)

N	V
Greatness	endures.

(b)

N	V	A
Hope	springs	eternal.

(c)

N	V	Av
Cowards	back	up.

TRANSITIVE

III. (a)

N	V	N
Movies	relieve	boredom.

(b)

N	V	N	N
John	gave	me	help.

(c)

N	V	N	N
Kennedy	made	Rusk	Secretary.

PASSIVE

IV. (a)

N	V
John	was kidnapped.

(b)

N	V	N
Rusk	was named	secretary.

The discovery by Donald J. Lloyd that statement-sentence patterns are few in number resulted from the application of the theory of functionality to syntax. Now it was clear that the operating methods of language are simple and that only four functions exist. These positions can be filled by variables. The following substitution frame illustrates the principle.

N	V	N
Money	is	power.
To work	is	to prosper.
Over the fence	is	against the rules.
Why he said it	is	what I do not understand.
For him to play	is	for me to lose.
Swimming	is	walking on water.
Arrested	means	disgraced.
It	is	he.
Too little	is	too late.
This	is	that.
"May have been"	means	"never was."
"I am"	means	"I exist."
Everybody	means	nobody.
Sometime	means	never.

Variables work in the adjective position before a noun:

A	N
the tall	man
the weeping	
the disabled	
the still to be chosen	
the on the move	
the I know it all	
the who am I to say	

Variables fill the adjective position after a noun:

N	A
The man,	tall and stately
	standing at the rail
	perched on the roof
	soon to be chosen
	on the corner
	who is carrying a book
	there

The verb position is filled by variables:

N	V	
The man	goes	to town daily.
	is going	
	will be going	
	shall have been taken	
	I-told-you-so-ed	me.
	on-the-cuffed	the purchase.
	upped	the price.

The adverb position is filled by variables:

Av
The man came here.
on the run.
while I was absent.
home.
to be seen.

The foregoing evidence makes possible the following conclusions:

1. Sentences are formulations of orderly arrangements of some or all of the four functions created from the four great word-classes.
2. These functions or positions can be filled by constants and by variables.
3. Any class of word or word-group that works anywhere – even a sentence – can serve in the noun function.
4. Variables, especially word-groups, work in the verb, adjective, and adverb functions.
5. With respect to size, functions are analogous to mathematical points on a line.
6. The parameters of a basic sentence are determined by the quantity of sound (words) introduced into each function.

The foregoing generalizations have moved us into areas that have not been explained thus far in this book. It is taken for granted that evidence is not needed to demonstrate the existence in English of word-groups or of structure-words, the heterogeneous class of about 300 language-machinery words.

The basic units in the code of English, therefore, are the four functions. From traditional grammar we know that the verb function is alone essential in an imperative or command-request sentence. The minimum required functions in statement sentences, as was demonstrated above, are N V, N V A, N V Av, N V N , N V N N. Each of these functions is expansible much as the fertilized human egg takes the shape of a fetus and then of a child. After a child is born, his body and all its parts expand until the genetic limits are reached. The varied lengths of sentences are analogous to body sizes, and rhetoricians' rules on this topic parallel medical charts giving norms of height and weight. Thus the skeletal structure of language is very simple.

Older grammarians apparently deemed impossible the coding of this skeletal structure of English because there are no inbuilt signals to designate most or all of the members of the four great word-classes. Some languages do have such signals; for example, German base-form verbs invariably end in *-n*, as in *sein*, *singen*, *gehen*. The German use of an initial capital for nouns in the written code doubtless had its origin — whether intuitive or scientific — in an attempt (at a time when writing rather than speech was deemed language) to designate the noun by an analogous device. The principle of functionality, however, makes it clear that inflections for word-class, as well as for position as in English pronouns and in most Latin words, belong to the code of vocabulary operation and not to the skeletal code. In short, then, just as the nervous system has an operating code and a message code — cold, hot, smooth, rough, soft, pointed, etc. — so a language system has the same two codes. The primary level of the operating code consists of the possible arrangements in sentences of the four functions.

III

THE CODE OF VOCABULARY PLACEMENT

If vocabulary activates the primary code, then vocabularly must have its own methods and principles of filling the four functions, just as the messages on the nerve lines are expressed within the coded physiological system. Thus it becomes necessary to investigate the nature of the variables that substitute for the four word-class constants and to discover the principles underlying the arrangements that give coherence and unity to variables of two or more words. Our analysis can begin by enlarging the constant in a noun function, the position of *Girls* in "Girls sew."

Girls
The girls
Those girls
Our girls
The little girls
The very little girls
The very little, laughing, golden-haired girls
Girls, little, laughing, and golden-haired, who are wearing gym suits

The number of syntactic variations open to a speaker in filling this function is fairly large, but, the principle of limits being what it is in language, this number must be finite rather than infinite. The unified relatedness of each group, no matter how large, makes possible the statement of the following principles.

1. Word-groups have basic well-ordered arrangements and then may be further enlarged by the addition of other well-ordered elements or by elements added by the principle of permutation.
2. A principle of modification provides for systematic procedures in enlarging a word-group:
   (a) addition before a headword of a group.
   (b) addition after a headword of a group.
   (c) addition both before and after a headword of a group.
3. A principle of connectedness or connexity provides for the coherent linking together of chains of groups into a unit or span that fills a function (as in this sentence with the aggregate beginning with *the*).
4. The principle of functionality applies to the organization of word-groups as it does to sentence arrangements.

Thus far the code of vocabulary placement has been identified, although it has not been worked out in detail. The operations at this level are in harmony with those on the basic level of functions, as a symbolic model shows of a sentence whose basic structure is N lV N:

D	I	A	A	A	N	Prep	D
			V-ing	V-ed/en			
The	*very*	*little,*	*laughing,*	*golden-haired*	*girls*	*on*	*the*

N	ClM		V	A	N	lV	A	N
		v	V-ing					
floor	*who*	*are*	*wearing*	*gym*	*suits*	*are*	*my*	*daughters.*

The problem remains of giving a different mathematical symbolism to these operations, especially to describe the methods and limits of procedure.

IV

THE CODE OF VOCABULARY MORPHOLOGY

Words take different shapes in English to reflect grammatical ideas. Nouns and pronouns, a subclass of nouns, show case and number; pronouns also show person. Verbs show tense, number, person, mood, and aspect. Adjectives and adverbs show degree. These matters, involving inflection and composition (the union of two or more words to achieve one unit), are familiar topics in traditional grammar and need no explanation or illustration here.

Derivative words take shapes to fit their uses. In English these changes are effected by the addition of affixes (prefixes and suffixes), as in *stable*, *unstable*, *stability*, *instability*, *stabilize*, *stably*.

By the use of the principle of functional change, any word in any other class can serve in the noun position. Some nouns and some adjectives can serve as verbs. Nouns serve as adverbs. Words in new duties take on, as is appropriate, the shapes of the word-classes in whose functions they serve, as in "He *gentles* his touch," "He *chickened* out," "We will *up* our prices," and "He lives next *door*." Thus the third level of operations is performed by the code of vocabulary morphology.

V

THE CODE OF PHONEMIC PRODUCTION

The single sounds and groups of sounds that rush from the mouth in rapid succession obey the rules of utterance formation; that is, first of all, they are subordinate to the primary code of sentence making, to the code of vocabulary placement, and to the code of vocabulary morphology. Yet the production of language sounds is within the limits and the capabilities of the speech tract, an area whose own code of operations is not known. Hence two different sets of operations coalesce. One set gives order to the vocabulary items; the source of this ordering is in the speech center in the brain. We do not know how this work is performed, and so we repeat that the mystery of language lies only in its origin in mental power. The other set of operations puts sounds into the ordered language units. The speech center also tells the motor cells to energize the speech tract; we do not know how the brain carries on these multiple, simultaneous activities. But we do know how the sounds are made; physiologists and physicists have explained these matters. Our interest is in the system evident in the sounds after they leave the mouth and nose. Therefore we can say that the code of phonemic production provides the systematic system of vocal signals in patterned arrangements of time, pitch, stress, and juncture.

If one listens to speech without attending to the message, the intonational pattern or tune is heard. Probably the first items to be noticed are the drum-beat-like primary stresses or loudnesses that are placed on the sentence functions, as in *Birds fly* and *The very little birds are flying* or in *Haste makes waste* and *An unnecessary* *haste makes much distressful waste.* Basic or expanded sentences are alike in the placement of these primary stresses. An adverb added to the verb normally receives a primary stress, as in *Birds fly fast* and *The very little birds are flying fast.* The validation of the sentence-pattern arrangement by verb classes on page 61 is achieved by the discovery that the verb *be* as a linking verb does not ordinarily take function stress, as in *John is captain* and *Honesty is the best policy.* When word-groups fill the sentence functions, the primary stress must be upon the headwords, as with *fly* in *are flying,* with *boy* in *The very little boy is here,* with *say* in *To say that I exist is enough,* and with *ball* in *"On the ball" means 'alert.'* Clauses usually take the primary stress upon the clause marker (subordinating conjunction and relative pronoun). These primary stresses in sentences are focal points in the rhythmic flow of utterances; all other stresses occur in relation to them, just as the syntax is built around the subject and predicate functions.

The code of vocabulary placement provides for secondary stresses. The adjective and the adverb or intensifier that modifies an adjective receive secondary stress, as with *very* and *big* in *The very big house is mine.* All adjective prepositional phrases and infinitives have secondary stresses on headwords, as with *roof* in *A house on a roof is a penthouse* and with *win* in *A man to win must work.* Clauses usually have secondary stresses on the sentence functions, although clause markers may take the primary stress, as with *that* in *That he is going is sure.* A speaker's emphasis in his message-making may cause a stress in this code to be primary.

The last two examples illustrate one aspect of the operation of the code of vocabulary morphology, because the infinitive *to win* and the verbs *must work* and *is going* are compositional forms which are made with a structure-word plus a headword. The special stress is always on the headword. The lowest level of stress is put on inflectional and derivative affixes in words like *going, stately, likewise, newer, tallest, rusty, hopeful, boisterous, manhood, agency.* Ablaut as in *man, men; goose, geese; ride, rode, ridden* is accomplished in this code. Also the placement of stresses in polysyllables like *generosity, affability* occurs in this code. The bases of words usually receive special stress, but the compounding of words and the polyglot origin of much English vocabulary make the operation of the code of vocabulary morphology highly complex. Since broad principles rather than minute analysis is our purpose in this book, it is possible only to say that, in general, headwords and bases are usually specially stressed. Use in a sentence function, meaning, or the speaker's intention can lift the stress to primary. Theoretically this code would seem to provide for tertiary stress in some structures, as with *in* in *into* in *He went into the forest.* Or it may be that there are only three necessary levels of stress in English. What seems clear is that many problems in the stress system in versification are solvable only by an evaluation of the writer's intended emphasis in relation to these systematic procedures.

Every sound or group of sounds, by being pronounced, has at least a fourth or lowest level of stress, as with *a* and *the* in *A boy is in the house.* The term unstressed is commonly used for this level in treatises on versification, wherein a too rigid simplification of stress is usually given. English poetry avoids the sing-song implicit in prosodists' symbolic models by exploiting the four-level stress system. Inflectional and derivative suffixes, as illustrated above, have fourth-level stress.

The code of phonemic production gives pitch to the vowels by putting them within the speech gamut according to their placement in the mouth and also in one of the four gamuts according to the intended meaning in relation to the speaker's emotional state. It may be, of course, that the speech tract necessarily places each vowel in the gamut; if so, the code of phonemic production puts the tone in its appropriately pitched gamut.

The junctures that separate sounds and groups of sounds seem to be related to four codes. As we listen to emitted speech sounds, we can detect the separations and jointures as they occur in homogeneous time relationships.

The distinctive tune or musical melody of every language arises from the combination of its segmental phonemes with the suprasegmental phonemes of pitch, stress, and juncture in a consistent tempo or sets of tempos. Of all that is marvelous about life, probably the human skill in speech should arouse attitudes of awe and reverence as well as gratitude.

The foregoing normalization of the process of speech production has not taken into account the brain's message-making activity. The delays in utterance, hemming and hawing, and intrusive *ah* and *aw* sounds doubtless derive from psychological sources not related to the system of speech production.

VI

THE TOTAL CODE OF LANGUAGE

The total code of a discrete language involves the four levels of activity plus tempo described above. The separate codes are

1. The basic code of functional arrangements in sentences.
2. The code of vocabularly placement.
3. The code of vocabulary morphology.
4. The code of phonemic production.

These four levels of simultaneous operation are similar to those in certain data-processing machines. The basic code distributes items in their appropriate columns. The second code lists the right names and-or quantities in these columns. The code of morphology brings the appropriate spelling of names or numeration of quantities. The fourth code concerns the printing of each individual letter or number in rapid sequence. This fourth level seemingly takes place as the only one. Yet if the machine were not set to embrace the other three codes, there could be no organized presentation of the data.

To the physiologist belongs the problem of the brain's method of handling this four-leveled code simultaneously with the other codes in the body's operation and particularly with the code of speech activation. What is possible now is a symbolic model of a sample of language-code operation on the four levels. The nonsense verse "Jabberwocky" by Lewis Carroll is here used, because the total code obviously dominates the vocabulary. There is no message in the usual sense, but there can be no doubt about the fact that the stanza is "good English" as far as the code is concerned.

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogroves,
And the mome raths outgrabe.

The basic code of functions is

N lV A, and N
V and V Av:
A lV N,
and N V.

The code of vocabulary placement is

N lV A, and D A N
v V and V Prep D N:
Av A lV D N,
and D A N V.

The code of vocabulary morphology here equates the German adjective ending of *brillig* with the English *-y*.

It lV ----y, and the ----y ----s
Did to-V and to-V in the ---:
Av ---y were the ----s,
and the ---- ---s -- ed--.

The mediate *ed-* in the slot for *outgrabe* indicates an irregular past tense.

The fourth code is that of the phonemes. Since we are not using phonemic notation in this book, the reader will formulate the intonation pattern as he reads aloud the stanza with the other three codes in his eye.

These symbolic models leave much to be desired. Every particular item in the system should have its own sign. Still, the reader can understand the procedure. The combination of the four levels is not unlike a musical score or the necessary provision on data-processing cards for simultaneous activity. If the foregoing analysis is correct, there remain a number of research areas for investigation. First, of course, is the validation of these intuitively perceived structures and principles. Second, a mode of notation for each level and each item must be devised. Third, further mathematicizing of the operations seems desirable. Fourth, the relationship of these theories to machine-translation practices deserves study. Fifth, the proper didactic procedures in teaching language must be formulated. Sixth, if language is an expression of the principle of societal homeostasis, the social uses of language need restatement.

CHAPTER V

THE CODES OF SPEECH AND WRITING

A language code is an organized set of signals designed to transmit messages. The invention of writing as a substitute for speech requires that a distinction be made between the code of speech and the code of writing. A speech code is a set of human vocal signals. An alphabetic code of writing is a set of graphic signals that substitute for the vocal signals of a discrete language. The dots and dashes of the limited Morse Code substitute only for alphabetic letters. The highway traffic-light signal code uses illuminated circles of colored glass as substitutes for the words *stop, caution,* and *go*. Many variations upon these devices have been formulated to create codes that will be secret or at least will hide the message from persons not entitled to read it. Edgar Allan Poe's "The Gold Bug" contains a message coded in Arabic numerals. In time of war, ever since the Romans set out to conquer the world, official messages have been communicated in secret codes. The important language science of cryptography grew out of the need to write secret codes and to decipher the codes used by the enemy.

I

THE QUALITIES OF A SPEECH CODE

Eight qualities mark a speech code. (1) The number of phonemes or minimal sound signals must be comparatively few in number. English has 33 segmental phonemes, Hawaiian has 13, and Finnish has 21. No language is known to have more than 45. When compared with the vocabulary of many thousands of words, this number — whether 13 or 33 or 45 — is small enough to be managed easily. (2) The phonemes must be distinctive enough to be recognizable as separate sounds. In a way they are like the tones on a musical scale; they are made by the same instrument, but each has at least one characteristic that sets it off from the others. Thus the initial sounds in pairs like *bit* and *pit*, *dent* and *tent*, *fend* and *vend* become distinct through slight contrasts. (3) The phonemes must be homogeneous; that is, they must be alike in nature, in the method of production, and in the time required to produce them. They are alike in that they are sounds made wholly and only by the speech tract and not, as might be possible, in part also by snapping the fingers or slapping the body at different places or stomping the feet. The time in making each phoneme is approximately the same. (4) Phonemes must have no meaning in themselves. They are signals capable of serving in any code in which they fit. Nearly every language has the phonemes /k, l, m, n, a, e, i, u/. If they had specific meanings, their utility would be greatly limited. The existence of *a* and *I* as words in English must not be deemed an exception to the generalization here stated. These words have meaning only when they are used in utterances. By themselves *a* and *i* are meaningless except as they are recognizable as a part of a system; the capital letter assigned to *i* in print indicates how the code of writing gives a special identity to the letter and makes it into a word.

(5) Phonemes must combine readily with each other in the rapid flow of speech to create morphemes or groups of sounds that do have the meanings assigned to words and parts of words in dictionaries and lexicons. A morpheme has lexical meaning, and some have code meaning. Morphemes are not necessarily syllables; they are meaning units within words. Thus in the preceding sentence *morph, eme, s, are, not, ne, cessari, ly, syl, la, ble,* and *s* are morphemes. Morphemes are determined on the basis of the etymology of words and on their forms or morphology in the code. There are three kinds of morphemes: (a) those like *eme, s, la,* and *ble* are elements or working parts in the vocabulary code; (b) *not* is a structure-word in the primary code of functions; and (c) those like *morph* carry only lexical meanings.

(6) The morphemes must unite in consistent ways to form a system containing a limited number of fixed syntactical arrangements that combine to make utterances or sentences. A language is a system; that is, it must be a logically related set of parts that operate the same way repeatedly. If you will pronounce the following sentences aloud, you will be able to hear the morphemes that recur and to notice the similarities in syntax.

A life is like a boat.
A lifeboat is like a house.
A houseboat is a floating house.
A boathouse is like a garage.

(7) A characteristic rhythm marks each discrete language, and characteristic intonational patterns or tunes add a musical quality to the rhythm. Rhythm, of course, is the bass drum beat in music; the tune or melody is the upsy-downsy given by the other instruments. The Morse Code is transmitted by expert telegraphers in a music appropriate to that system. The best way to discover the music of language is to listen to speeches in tongues not known to you and then to hum the tunes you hear. You can do the same for English if you can listen to the music and not to the word-meanings of a speaker. The scientific method of describing intonation employs the concept of suprasegmental phonemes. There are four levels of pitch, four degrees of stress or accent or loudness, and four lengths of pauses or junctures after phonemes, morphemes, larger meaning groups, and utterances (sentences).

(8) The code is put to work by the vocabulary. The code by itself can do nothing; it lies latent and potential in the human mind. The vocabulary is like the gasoline that flows into a motor. In its raw state it does not do an efficient job. Aerated and given a gaseous quality by the carburetor, the gasoline performs well. Words must fit the code. The code does not adapt itself to the vocabulary any more than a motor adapts itself to gasoline.

II

THE CODE OF WRITING

Graphic signals are used in the code of writing to substitute for speech signals. The fascinating story of man's long quest for a satisfactory means of recording his speech is told in *The Alphabet, A Key to the History of Mankind* (1948) by David Diringer. Many different devices were tried out by primitive men. The wedge-shaped signals called cuneiform may have been the earliest. Hieroglyphics, ideographs, and syllabaries were invented. The Chinese and Japanese still use ideographs. The English alphabet came from the Romans, who had modified the ancient Greek alphabet. All western languages are indebted to the Greek for their writing system. Some languages, like those of the Russian and other Slavic peoples, use graphic signals fashioned on the Greek model; English, Italian, French, German, Spanish, Portuguese, and the Scandinavian tongues have followed the Latin system.

Latin had 23 letters; English added the letters *j*, *u*, and *w*, which were not in Latin. The vowel *i* in *insulate* was distinguished from the initial consonant in *Iulius* by the adoption of *j*, as in *Julius*. Although this change was completed by the early 17th century, Dr. Johnson in 1755 and John Ash in 1795 kept words with these two initial letters in the same list. Noah Webster separated them in 1806 in his *Compendious Dictionary*. Similarly the letter *u* was interchanged with *v* and considered the same letter. Dr. Johnson saw the difference but continued to print one list: "*V* has two powers, expressed in modern English by two characters, *V* consonant and *U* vowel, which ought to be considered as two letters; but as they were long confounded while the two uses were annexed to one form, the old custom still continues to be followed." In 1806 Webster silently made two lists; in 1828 he made the following remark under *V*: "*V* and *u* were formerly the same letter, . . . but they have now as distinct uses as any two letters in the alphabet, and are therefore to be considered as different letters."

The sound for which *w* stands in *wade, water, wild* was in Old English; then it was represented by *u* or *uu* until about 900 A.D., when a wen was introduced. The double *v* as in *vvent* came with French scribes after 1066 A.D. Because *u* and *v* were counted the same letter, the name *double-U* was adopted. Most English words beginning with *w* are of Teutonic origin and entered the language through Old English.

Although *k* had been in Latin, it was not used in Old English. It was added in Middle English to replace *c* before *e* and *i*. Hence the forms *con* and *ken, cow* and *kine* survive to make English spelling seem erratic. Nearly all the seemingly irregular spellings result from some historical fact. Thus the word *restaurant,* for example, is built on the old spelling of *restore,* which was *restaur,* that came from the French and ultimately from the Latin *restaurare.*

In a perfect writing system there would be a single graphic sign for each segmental phoneme and for some frequently spoken diphthongs and triphthongs. The correspondence of sound and spelling would make it easier for children and foreigners to learn to read. The fact that English spelling contains a great deal of history, as has been said above, gives pause to most scholars when asked about their willingness to favor a radical reformation of spelling. *Night* and *light* show their origin in the Teutonic antecedents *nacht* and *licht.* The plural *men, geese,* and *mice* contain remnants of the old internal vowel change called ablaut, a formula that also appears in irregular verbs, as in *drink, drank, drunk. Mans, gooses,* and *oxes* could be learned more easily than the irregular noun forms, but a conservative tendency to cling to old forms marks many people's thinking about every aspect of language. *Romans, nooses,* and *boxes* prove that the retentention of the old plurals is a matter of habit and not of necessity.

Writing does not have an adequate way of showing the suprasegmental phonemes of pitch, stress, and juncture. Capital letters, italics, and punctuation carry some of the indicators, but the correspondence between sound and mark is not consistent. It should be noted in passing that punctuation works as a system and should be handled that way.

III

QUALITIES OF A CODE OF WRITING

The qualities that mark a speech code must also mark a writing code. (1) The number of graphic signals must be small. English has an alphabet of 26 letters, a unit of space, and 12 marks of punctuation (period, comma, semicolon, colon, question mark, exclamation mark, opening and closing marks of parenthesis, hyphen, dash, and single and double quotation marks). To these 39 basic marks (space is a mark) can be added many arbitrary signs and abbreviations; these include the Arabic numerals and the special signs for the various fields of knowledge. Good dictionaries usually have a list of these signs in an appendix. Numerals and signs are really abbreviations or substitutes for words and therefore must be considered as a part of the vocabulary and not of the alphabetic system. (2) The graphic signals must be distinctive enough to be recognizable as separate marks. (3) They must be homogeneous; that is, a system of alphabetic letters must not include hieroglyphics or ideographs. The principles of structure must take into account the contrasts open to light and heavy portions of the lines forming letters, open and closed curves, and the height of contrastive portions of each letter above the imaginary baseline and the distance that some letters drop below an imaginary baseline. Because alphabetic letters are forms of drawing, the principles of design must relate to that art; there is no necessary correspondence in the size of a letter and the length of time necessary for the pronunciation of the segmental phoneme that it represents. (4) Graphic signals like alphabetic letters or the crossed arms of a railroad warning marker at a grade crossing must have no meaning in themselves; they must take on the meanings that are assigned to them in the code of which they are a part. Alphabetic letters, for example, mean one thing when used in the writing code to form words; they mean something else when used in the writing code to label a list of items or to label the rhymes in a poem or to indicate items in a blueprint or to serve as integers or exponents in a mathematical equation.

(5) Alphabetic letters must combine readily to form words that have lexical meaning and that have a correspondence with the morphemes for which they are a substitute. Words are the building blocks of thought, and it is natural to pay great attention to them. Just as there are three classes of morphemes, so there are three kinds of words: (a) English has about 300 language-machinery words like *a, an, and, but, with, shall, not, where;* (b) there are thousands of general meaning-carrying words in the classes of noun, verb, adjective, and adverb; and (c) there are a million or more particular or proper names for persons, places, events, etc., that receive the distinctive indicator of an initial capital letter. A difference between the code of writing and of the code of written vocabulary is seen in the fact that the code of writing

requires a capital letter at the beginning of a sentence, whereas the code of written vocabulary requires the capital letter at the beginning of a proper name.

(6) Words combine in consistent ways to form a system containing a limited number of fixed syntactical arrangements that combine to make sentences or parts of sentences. The fixed machinery of written language consists of (a) syllables, (b) words, (c) minor word combinations like groups, phrases, dependent clauses, clusters, and connexes, and (d) major word combinations called sentences. The first device, syllabification, is a part of the code of vocabulary morphology. The other three devices belong in part to the code of vocabulary placement and to the primary code of functions. These four kinds of elements constitute the operating parts of the system. A sentence pattern is like an automobile motor. It is fixed in nature, it has single parts, and it has groups of parts. Just as the motor is autonomous and operates by its own rules, so does a sentence. Just as there are different sizes and organizations of similar motors, so sentences have different sizes and shapes. Yet all sentences do the same message-carrying job.

(7) The rhythm in the graphic marks of the writing code is quite different from the rhythm which results from reading aloud whatever is written. The second kind is identical with that in the code of speech; poetry builds upon the notion that it is written to be read aloud, and indeed most writers test the quality of their work by oral renderings. The rhythm of script or of print is associated with the art of drawing. Large and small letters, light and dark letters, plain letters and those with serifs, and a harmonious mixture of different type sizes and designs are united on some pages to create patterns that are beautiful or ugly, attractive or repulsive, dynamic or list-

less. The art of typography has many notable practitioners, as may be seen by examining magazines with text and with advertisements. The system of print, therefore, is associated with the code of writing. Where speech gives the rhythms of music, writing gives the rhythms and designs of geometry and drawing.

(8) The code of writing is put to work by words exactly as is the code of speech. The code is ready for use, just as is the art of drawing or the science of geometry. Only when an idea energizes a writer does the code come into use. Until this action occurs, the code is like a brush, palette, colors, easel, and board that stand ready to be used. The materials of the system are available, but until the speech center of the brain tells the motor cells to go to work, nothing happens. With a command, both the code and the vocabulary, as well as the writing muscles, spring into action.

IV

THE AUTONOMY OF A LANGUAGE CODE

A language code is autonomous. Like the code of a weaving machine or an automobile, a language code operates by its own principles in its own way. Any interference with a principle alters the mechanism. Adjustment of parts within the machine is possible, of course, and by the principle of functionality — another way of saying "interchangeable parts" — a great deal of variability is possible in filling the sentence functions. Thus foreign-language items can fit into a native-language utterance or composition. Whatever sounds (or words) are thus introduced must be in either code. Any deviation from this rule leads to a new code — a dialect code — that must be treated as a discrete language. Such a dialect code parallels an individual person's code in its systematic deviations from the norm of a speech community's usage.

Changes in any discrete-language code are easy to make by an individual, as in *I is, you is, he are, us is,* etc. The permanent community-wide acceptance of such innovations is possible, but they are rarely achieved unless some compelling, arbitrary power (political, religious, or educational) is exerted. However, when an extension of an existing principle is embodied in usage, as in English with the progressive tense forms, the addition of *get, start,* and other verbs as auxiliaries, the exploitation of the verb plus adverb combination, and the currently mushrooming noun plus *-wise* adverb formula, the code adopts these newnesses by the principle of functionality. There really has been no change in the code, only an increase in the vocabulary.

CHAPTER VI

VOCABULARY AND THE CODE

I

MESSAGE-MAKING

The message transmitted by a code results from the employment of vocabulary. The idea which gives rise to an utterance takes shape in ways that are not wholly understood by psychologists and neurologists. Some elements in the process seem clear. There must be an already mastered code and vocabulary in the speech center of the brain. Because most people use only one code, it is sometimes assumed that this one code and the right words are always ready to slip out of the voice apparatus. The fact is that persons who can speak two or more dialects or languages must choose a specific code and the vocabulary that fits that code. In making this choice there is a decision to use some or all of the language experience that the brain has accumulated in this code. Elders have a way of "talking down" to children, and natives try to use simple sentences or even single words in talking to foreigners. Thus code and vocabulary arise in the mind at the same moment. Nobody knows how the brain cells bring them together. A tension between the two is sometimes created. A speaker may say a word or two but cannot find the right structure, or he may begin with structure-words and then cannot fit his words to that structure.

The basic principle is that code and vocabulary intersect at all points. For example, a plural subject requires a plural verb and plural pronouns as substitutes. Once the plural noun is chosen, the system insists on appropriate forms related to the noun. Likewise when a structure is begun, as in "For him to go . . .," the system takes over and requires that the sentence be completed in terms of that start. The order of the words or sentence elements must be that of the system. The corollary principle is that discourse is not possible unless the speaker or writer knows the code and the vocabulary related to the idea he wishes to convey. Yet it is often true that a speaker "hunts" for words. The analysis of the total process of message-making is highly complex; there are many factors to be considered.

In ordinary conversation it is taken for granted that a speaker has command of the code and of the vocabulary. Yet nearly everyone at times is unable to finish a sentence because of its structure or to find the right word. By means of gestures and noises a speaker can compensate for these lapses. A writer, however, must fulfill the requirements of the code and the message. Depending upon the receiver, the written message may be in abbreviated telegraph style or in whatever form the sender can prepare. The standards of printed language usually are applied to school writing, but in the world at large a great degree of variation and incompleteness is common. The occurrence of non-sentences should not occasion remark, for most systems can be used partly as well as completely. An automobile motor can power a boat's propeller or a carpenter's rotary saw as well as wagon wheels. Advertisements in newspapers, especially the want ads, often employ lists of words and abbreviations; stockmarket quotations give names and figures; mathematics and chemistry employ arbitrary signs and numerals. These variations are possible because they always have reference to the code. People who have difficulty with specialized areas of knowledge usually are deficient in a capacity to relate the new knowledge to the code.

The interrelationship of code and vocabulary is seen best in the natural and mathematical sciences. No matter how complicated a mass of symbols may be introduced into a sentence, the operating requirements of the sentence must be met. Similarly, no matter what kind of vocabulary may be used — everyday or highly technical — the sentences follow the formulas of the code, as in "Phylogeny repeats ontogeny" and "Son imitates father." The code is like a fixed apparatus or machine. It does its job its own way. The word stuff processed by the machine must be adapted to its ways of operating. Thus the primacy of the code makes it possible to understand vocabulary better.

II

VOCABULARY AND AREAS OF KNOWLEDGE

Vocabulary operates systematically as part of a charted area of knowledge. The alphabetical arrangement of entry words in a dictionary leads many people to believe that words are helter-skelter and that a learner must acquire them individually and then use them wherever they seem to fit. Some schemes designed to build vocabulary suggest that if a person will learn a few new words a day, he will increase his language power and maybe get a better job. Of course, the more words a person has, the better off he can be. But words do not work alone. They are part of a group and must be understood in relation to the others inside the group. The number of such groups is probably uncountable, for every specialized subject matter, every community, and every family has one or more groups of words whose meanings are dependent upon the contrasts established by the group itself. In the area of family, for example, the following contrasts are well known: *parent: child, father: mother, brother: sister, son: daughter, uncle: aunt, nephew: niece.*

Contrasts are not always sharply defined. The vocabulary of a staircase includes *stairs, step, riser, tread, balustrade, baluster, handrail, wall string, outer string, newel post,* and *newel.* A man's hat includes such terms as *crown, brim, fold, hollow, edge, hatband, bow,* and *sweatband.* These are examples of the names of a physical thing. Such a thing as a hat forms a class, whose members include *opera hat, top hat, derby, homburg, fedora, sombrero, kepi, pith helmet, policeman's hat, straw hat, felt hat,* and *silk hat.* Kitchen utensils include *pot, pan, saucepan, dishpan, frying pan, skillet, kettle, tea kettle, coffee percolator, roaster, fryer, ladle, potato masher, spatula, rolling pin, grater, colander, grinder, bread board, bread box, mixer, sink, stove, hot plate, garbage pail, cabinet,* and *refrigerator.*

Wherever we go and whatever we do, we move into sets of words like those given above. We are "on the inside" when we know the language; we are "outsiders" when we do not. The insider's language consists not only of names of things, but also the verbs, adjectives, and adverbs that maneuver with these nouns. The total number of expressions, including idioms, that belong to a given area may be very large. In a sense, then, the sequence of learning a language is as follows. The child learns the system, and the remainder of his life is devoted to acquiring the vocabulary and usages appropriate to the varied subject-matter areas into which he moves or wishes to move. The primary responsibility of a classroom is to filter a new area vocabulary into the student's code. Employers usually act on the principle that first in the training of a new employee is the mastery of the special vocabulary of the office or shop. The success of a student or an employee lies in his quick and sure retention of vocabulary as well as the duties that are his special province.

On this level, then, vocabulary fits together like the names on a chart or a map or a blue print. The meaning of each word arises from its connection with, and its contrastive quality or denotation in relation to, the others. The same words appear in many contexts, so that there are as many meanings as contexts. It is sometimes stated that meanings are in people; they are to the extent that a word means what a person thinks it means. In fact, however, the meanings of words lie in the subject-matter areas in which they occur. Sooner or later, as a person moves into an area, he conforms his usage to that of the people who know the field.

The building of vocabulary, and the maintenance of a command over useful items, is the work of a lifetime. At each successive stage in life a new vocabulary becomes appropriate; children recognize this fact by mimicking their parents, grandparents, uncles and aunts, teachers, neighbors, visitors, and strangers. The differences often are startlingly sharp, because children have keen eyes and ears to see and hear these details. Acquiring them is their way of growing up. Grownups have a way of moving into a new age by complaint as much as by acceptance. They often resent growing older, and hence there are people of whom it is said that they do not act their age. Yet in one's jobs, clubs, church, and social asssociations the demand is always that one must live his age and talk appropriately. A person's language, therefore, is the operating code plus all the vocabulary that is appropriate to his age, status, duties, and avocations. If man differs from the animals in being a system maker, it is obvious that he has much help from his being a part of many vocabulary systems within the larger language system.

III

THE METAPHOR SYSTEM

Vocabulary operates as a metaphor system. The basic meanings of words come from the charted areas in which they name and talk about things and experience. Endless other meanings are possible for these words by the device of metaphor. Metaphor is a form of substitution in which a word, a phrase, or even a sequence of sentences from one subject-matter area replaces a word, phrase, or sequence of sentences from another area. The device of metaphor uses two charts at the same time. An example is the 23rd Psalm: "The Lord is my shepherd; I shall not want. He maketh me to lie down in green pastures; he leadeth me beside the still water. . . . I will fear no evil: for thou art with me; thy rod and thy staff they comfort me. . . . I will dwell in the house of the Lord forever." The subject-matter area of shepherds has been superimposed upon the subject-matter area of God, so that some of God's qualities of benevolence, support, guidance, protection, friendliness, helpfulness, and comradeship can be understood as being like those of a good shepherd.

The purpose of a metaphor is to clarify what may not be understood in another area; ordinarily a metaphor provides an image or picture by which the first subject-matter field can be visualized. The concept of the changing forms of animals is the metaphor *evolution*, and the evolutionary process is clarified by the metaphor *natural selection*. Languages are sometimes treated as if they are human and belong to families; relationships are indicated by such statements as "German and English are cousins," "German and Swedish are brothers," and "French is a child of Latin." Poetry depends upon metaphor for its effectiveness, and prose uses this device liberally. Metaphors occur in everyday speech and in slang. In the following sentences the metaphors are italicized: a non-figurative equivalent expression is given in parentheses:

The wish is *father* to the thought. (source, origin)
Lord Burleigh was *a willow and not an oak.* (unstable)
Death is *a debt that all are bound to pay.* (inevitable)
The valiant *taste* of death but once. (experience)
Some books are to be *tasted,* others to be *swallowed,* and some few to be *chewed* and *digested.* (leafed through, . . read quickly, . . . studied and mastered)
Night *dropped her sable curtain down* and *pinned it with a star.* (was black, . . . a star appeared)
The poet should live in the country where he can *hear the heart of nature beat.* (learn the secrets of nature)
He called on the boss and asked for a raise but *didn't get to first base.* (was unsuccessful)

Metaphors can be expanded to great length for purposes of illustration and clarification. The following image of a storm is worked out in great detail; it is in Daniel Webster's speech in the U.S. Senate on March 7, 1850:

> We live in the midst of strong agitations, and are surrounded by very considerable dangers to our institutions and government. The imprisoned winds are let loose. The East, the North, and the stormy South combine to throw the whole sea into commotion, to toss its billows to the skies, and disclose its profoundest depths. I do not affect to regard myself, Mr. President, as holding, or fit to hold, the helm in this combat with the political elements; but I have a duty to perform, and I mean to perform it with fidelity, not without a sense of existing dangers, but not without hope. I have a part to act, not for my own security or safety, for I am looking out for no fragment upon which to float away from the wreck, if wreck there must be, but for the good of the whole, and the preservation of all; and there is that which will keep me to my duty during this struggle, whether the sun and stars shall appear, or shall not appear for many days. I speak today for the preservation of the Union.

Often called metaphor though technically different are metonymy and synecdoche. Metonymy means a change of name' and operates by substituting for a literal name the name of something connected with it. Here are seven ways in which metonyms are formed:

1. The author for his work, as in "Our library has all of Faulkner," "Look it up in Webster," "I like Eliot."
2. The container for the thing contained: "The bottle (alcoholic beverage) is deceitful," "The kettle (water) boils," "The editorial (opinion) is pessimistic."
3. A quality for the thing: "The oval (running track) is fast," "He is in the pink" (good health), "He plays to the grandstand" (audience).
4. Symbol for office: "The crown (ruler, king, queen) forbids it," "The big desk (boss) wants speedy service," "The red cap (porter) is always courteous."
5. Cause for effect: "He writes a beautiful hand" (penmanship).
6. Effect for cause: "There is death (something that causes death) in the bottle."
7. Abstract for concrete: "Youth and beauty (the young and beautiful people) shall be laid in the tomb."

Synecdoche substitutes the name of a part for the name of the whole thing, or it may substitute the whole for the part. Some ways of forming synecdoche follow:

1. The part for the whole: "She has seen sixteen summers" (years), "The sail (yacht) is on the horizon," "We need ten hands" (employees).
2. An individual for the species: "He has the Midas touch" (wealth-getting ability).
3. The whole for the part: "The Navy (an officer) took charge."
4. Material for the thing made out of it: "The pigskin (football) is white for night games," "The marble (monument) speaks," "The rubber (tires) need replacement."

Personification is a form of metaphor that attributes life and mental powers to inanimate or abstract things. The commonest form of personification occurs with adjectives and consists in ascribing the qualities of living things to inanimate objects, as in "the raging storm," "the hungry shore," "the smiling land," and "creeping socialism." Another form of personification occurs with verbs and consists in making inanimate objects perform the actions of living beings, as in "The very walls will cry out against you," "The waves beat a tattoo on the shore," "The motor gurgles with delight." The third form of personification consists in giving the status of a particular human being to, and thus making a proper noun of, a feeling, idea, or quality, as in Alexander Pope's "Windsor Forest":

> Exiled by thee from earth to deepest hell,
> In brazen bonds shall barb'rous Discord dwell;
> Gigantic Pride, pale Terror, gloomy Care,
> And mad Ambition shall attend her there:
> There purple Vengeance bathed in gore retires,
> Her weapons blunted, and extinct her fires;
> There hateful Enmity her own snakes shall feel,
> And Persecution mourn her broken wheel:
> There Faction roar, Rebellion bite her chain,
> And gaping Furies thirst for blood in vain.

The metaphor system extends into long passages and even into a whole work by the devices of parable, fable, and allegory. Parables, like those of Jesus in the New Testament, are descriptive-narratives of small commonplace incidents that give serious instruction in religious matters quite different from the basic statement. A fable is an animal story designed to teach a moral truth about human conduct. An allegory is a narrative or basic story that has at least three more levels of meaning. Herman Melville's *Billy Budd,* for example, is the story of a young sailor accused of mutiny; it is also a modern version of the life of Christ. The third level concerns any human being's entanglement in an arbitrary institution as a parallel to Billy's entanglement with the British Navy. The fourth, and the most necessary level is an allegory, concerns the metaphysical or universal basis on which the other three levels operate; in this instance it is that man must sacrifice his own life to injustice if he wishes to help advance the cause of justice in society. In William Faulkner's "The Bear" the initiation of Isaac McCaslin into the Mississippi wilderness has similar levels of meaning: entering the forest is like becoming a priest; the culmination of this experience must be a renunciation of the outmoded Southern view of the economics and segregationist attitude of slavery; and the unprovable metaphysical presupposition is that taintlessness, incorruptibility, and honor must mark the man who will battle and lose in the struggle to advance human dignity and freedom.

A symbol is made by associating extensive emotional and intellectual meaning or experience with a noun, action, or situation whether used literally or as a metaphor. Thus, Billy Budd by being named "angel" and "infant Adam" and by his actions takes on the quality of Christ, Claggart becomes the embodiment of the Satanic principle, and Captain de Vere resembles Pontius Pilate. Similarly Isaac McCaslin enters the wilderness as a boy but emerges as a symbol; the wilderness, the old bear Ben, the mongrel dog Lion, Sam Fathers, the ledgers, and the commissary are enriched with dense meanings until they add to their ordinary meanings the additional ones of allegory. More obvious is the symbol-making formula of Nathaniel Hawthorne in *The Scarlet Letter,* wherein the silken red letter, the rose bush by the prison, the prison itself, the forest, the brook, and other items become richly embroidered with multileveled meanings.

Images constitute a special class of metaphors. Although the term *imagery* ordinarily embraces all types of figurative language, the term *image* denotes a particular type of pictorial statement that reinforces the thought structured in the total composition. The opening paragraphs of great fiction foreshadow the theme and action by images. Thus worked Henry James, who also interlaced systems of images through his short stories and novels. Stephen Crane in *The Red Badge of Courage* not only used colors as images but his opening sentences foreshadow a change for betterment in Henry Fleming's attitude. The straight rising smoke that far up turns to gray in *The Yearling* by Marjorie Kinnan Rawlings similarly foreshadows Jody Baxter's growth from irresponsible childhood into a good manhood. Edgar Allan Poe's "The Fall of the House of Usher" pictures each brick in the house as crumbling, although the structure still stands; the bricks represent the diseased state and eventual death of Roderick and Madeline. John Steinbeck's "The Red Pony" has many instances of death images that, seemingly a part of the setting, reinforce the theme of Jody's growing up to understand the concept of death. The fifth section of Walt Whitman's "When Lilacs Last in the Dooryard Bloom'd" represents on the surface level the passage of President Lincoln's coffin through the spring countryside. The inner images, however, describe death in terms of nature's rebirth, and thus undergird the poem's overriding theme of the welcomeness of death.

Over the breast of the spring, the land, amid cities,
Amid lanes and through old woods, where lately the violets peep'd from the ground, spotting the gray debris,
Amid the grass in the fields each side of the lanes, passing the endless grass,
Passing the yellow-spear'd wheat, every grain from its shroud in the dark-brown fields uprisen,
Passing the apple-tree blows of white and pink in the orchards,
Carrying a corpse to where it shall rest in the grave,
Night and day journeys a coffin.

The metaphor system gives rise to the imaginative and poetic effects of language. There is no telling when a speaker or writer will substitute metaphors for literal meanings. In general, metaphor represents an effort to give utterances their fullest, most expressive reach of meaning. The study of the metaphor system belongs less to the code than to the vocabulary, less to grammar than rhetoric. Significant, however, is the fact that the metaphor system operates by the principle of functionality. At every level in language there is identity in procedural methodology.

IV

THE COMPARISON SYSTEM

Vocabulary has a system of comparison. One of the grammatical devices of language is called comparison. Adjectives and adverbs are compared to show positive degree, as in *tall, stout, far;* comparative degree, as in *taller, stouter, farther* or *further;* and superlative degree, as in *tallest, stoutest,* and *farthest* or *furthest.* In these examples the comparison is of the same quality. The kind of comparison to which reference is here made is to the simile, the figure of speech which unites two unlike things or qualities or actions. Textbooks usually relate similes to metaphors, because a simile is a direct comparison of unlike items whereas a metaphor is an assertion of an identity of two unlike items. Similes most often are expressed by means of prepositional phrases (and thus again we see the intersection of the code and vocabulary). The basic formula employs the prepositions *as* and *like;* verb plus an adverb that also works as a preposition like *compare with, correspond to, parallel to;* adjectives and adverbs plus preposition, like *akin to, similar to, similarly to, identical with, identically with;* and nouns plus prepositions, like *identity with, similiarity to* or *with.* The verb *resemble* puts the compared item in the direct-object position, as in "His walking resembles a cow's waddle." The clause markers *as* and *as if* introduce similes in the structure of a dependent clause, as in "He stared as a cow stares across a fence at greener grass" and "He danced as if he were evading rows of upreared spikes." Samples of similes expressed by means of prepositional phrases follow:

> Your smile is like the dawn of a spring day.
> He shall be as a tree planted by the water, and
> that spreadeth out her roots by the river.
> Poets commonly have no larger stock of tunes
> than an organ.
> You are to my thoughts as food to life.
> As a jewel in a swine's snout, so is a fair woman
> without discretion.
> Life may be compared to a river.

He found himself facing a dilemma somewhat
akin to a gold prospector who spots a huge
nugget on the far side of a chasm perhaps
too wide to jump across.
His tones are similar to those of an angry bear.

Extended similes are common. In poetry such an expanded comparison, usually stated in a long dependent clause, is called an epic simile. An example is in the first eight lines of Shakespeare's Sonnet 143:

Lo! as a careful housewife runs to catch
One of her feathered creatures broke away,
Sets down her babe and makes all swift dispatch
In pursuit of the thing she would have stay —
Whilst her neglected child holds her in chase,
Cries to catch her whose busy care is bent
To follow that which flies before her face,
Not prizing the poor infant's discontent;
So runn'st thou after that which flies from thee,
Whilst I thy babe chase after thee afar behind;
But if thou catch thy hope, turn back to me,
And play the mother's part, kiss me, be kind:
So will I pray that thou mayst have thy *Will,*
If thou turn back, and my loud crying still.

An analogy is a comparison which is made between two unlike things for the purpose of indicating point-by-point similarities to provide proof for some particular exposition or argument. Whereas metaphors and similes are generally to be construed as illuminating flashes of imaginative power, analogies are carefully constructed to show obscure and remote relations between ideas for the purpose of explaining something that is not known or familiar by means of a very different thing that is well known. In a sense, therefore, the 23rd Psalm is an analogy as well as a metaphor. Ordinarily, however, an analogy is a comparison and uses the structural formulas of the simile.

V

FORMULAS AND SYMBOLIC MODELS

Vocabulary includes the systematic operation of formulas and symbolic models. The marvel of language is that it can transmit any kind of knowledge. Seldom do commentaries upon language deal with the relationship between ordinary expression and scientific notation. Yet the true quality of language appears most clearly when books in mathematics, chemistry, and other natural sciences are examined. It becomes quite clear that the language system remains the same; the change lies in the vocabulary. The vocabulary of mathematics, for example, does not consist merely in the words and arbitrary signs; it consists also of the numerically expressed formulas, equations, postulates, and theorems. Whether an item is in a sentence or not, it is still a member of the vocabulary system, because in oral discourse it must be stated aloud in language.

The science of mathematics has perfected the concept of language systematization. It has set up abstract terms that operate with self-consistent logic in ways that ordinary language might not be able to handle. Yet by establishing its procedures, mathematics (and so chemistry and other sciences) can perform its duties within the framework of ordinary language. At no point does the logic of language itself interfere with the logic of a mathematical system. Likewise the logic of mathematics cannot impose itself upon and alter the logic of language.

A vast step was taken when ancient scientists began to use symbolic models to indicate the movements of celestial bodies. The drawings that showed the intersecting orbits of planets indicated what other viewers must look for and what conditions are necessary, for example, to make an eclipse possible. By adding a scale of time, the dates of conjunction could be clarified and predicted. In a sense these early models were merely charts. Yet they led the way to maps, blueprints, and other graphic devices.

A most important early invention of this type was the musical staff and its series of clefs. These began as letters in relation to lines, so that the kinship between language and a symbolic model shows most clearly in musical notation. The clef signs still are F, G, and C. Notes, though replacing letters on the staff, still have letter names. The development of polyphony led to so many notes to be struck or sung at the same moment that the power of language to express the possible relationships was strained if not exhausted. The addition of time and meter further increased the complexity of written music. Today it is commonly thought that music is a separate language, but in point of fact musical notation is a form of natural language. Like, but more complex than, an abbreviation or a pronoun, the score of a musical composition stands as a substitute for natural language.

The value of a symbolic model like a musical score lies in its power to represent a situation and also to make thought about it possible. In this respect a model is exactly like any sentence. But a model has other qualities. It presents, unlike most sentences, a complete structure of some aspect of thought or experience. The benzene ring in chemistry, for example, represents pictorially a whole complex of arrangements that are logically related to each other and to the whole field of chemistry. The model, thus, presents a context within which specific and necessary elements must be taken into consideration every time this subject is being treated. From the model can be derived new methodological procedures, new hypotheses, and new postulates. Thus the logic that may be in music or in the benzene ring or in any other symbolic model is free to proceed in devising new truths. In the end these must be explained in natural language, but the means of attaining the conclusions may not have been possible by the use of the common tongue. Thus the development of symbolic models, which is the most important new achievement expected of scientists, is the highest form of vocabulary building. Lest it be forgotten, let it be said in conclusion that metaphors, comparisons, formulas, and symbolic models work within the limits of the code by the principle of functionality.

VI

IRONY

Language can express the opposite of the meanings usually attached to words, utterances, and actions. The rhetorical term *irony*, though often defined by the single words 'satire,' 'ridicule,' and 'sarcasm,' denotes any one of several different kinds of expression, all of which have in them the sense of 'opposite.' It is ironical when a person in a fiction unwittingly foreshadows his downfall. It is ironical when an event occurs that is the opposite of what might be expected, as in Thomas Hardy's "The Pink Frock," wherein a wife complains about not being able to wear a newly acquired dress because her husband has been killed in an accident. The ordinary use of irony involves the making of a statement which must be construed in the opposite sense, as in the words to a great homerun hitter: "Come around to our sandlot, and I'll teach you how to bat." Such statements usually are accompanied by a smile and are rendered in an appropriately cheerful tune. But irony may also have a deep seriousness about it, as in Jonathan Swift's "A Modest Proposal." As a means of relieving economic distress in colonial Ireland in the eighteenth century, Swift proposed (ironically) that the natives raise babies and children to be sold to butcher shops for processing as cuts of meat. The vocabulary system provides for this kind of utterance. The primary code remains the same, the vocabulary remains the same, but the fourth level of code, that of phoneme production, alters the intonational pattern to convey the intended meaning. Thus meaning is a result of the impress which the speaker puts upon the interaction of the vocabulary and all levels of the code.

CHAPTER VII

MEANING IN WORDS AND MESSAGES

In the words of Wilbur Marshall Urban in *Language and Reality* (1939), a 754-page discussion of the philosophy of language and the principles of symbolism from the point of view of idealism, analyses of language have taken "as its central and determining concept that of meaning." That is, "the question of what language is" is answered in terms of "what language does," and language to Urban was "meaningful communication," "an expression of reason," "an expression or embodiment of spirit," "a development of creative activity." This mentalistic view denies the possibility of establishing a positivistic theory such as the one stated in this book. As a consequence, it becomes necessary to say that if our fundamental doctrine is correct, much that has been written hitherto by Urban and others about meaning in words and messages is erroneously oriented. A replacement of the old theorizing is necessary.

Language is a mechanism, a device whereby the mind is able to render an account of its intake and output in a systematic manner. The rules of the mechanism must be charted before it is possible to understand the structure and meanings of messages. Only those meanings are possible which the vehicle can convey.

I

CODE ELEMENTS AND MEANING

We have said that phonemes have no meaning in themselves, because they are manipulatable entities whose duty is to form meaning-carrying units or morphemes. But neither do morphemes or words have meaning in themselves, because as surrogates of experience they must be free to take on the meanings assigned to them (as we saw in the preceding chapter). The morpheme *fine* has at least fifteen discriminated meanings in desk dictionaries ranging from 'perfected,' 'superior in quality' to 'conclusion' (as in "in fine"), and 'not coarse' (as of sand), and 'a sum of money paid as punishment for an offense.' The etymological argument that new meanings result from an extension of meanings given to a root concept has validity only as proof of the migration of words from one language to another and from one area of discourse to another. The difference between *bear* ('to carry') and *bear* ('a ursine animal'), two of the oldest words in English, demonstrates that morphemes and words adventitiously take on the meanings which are assigned to them by a speech community. This fact is commonplace in the naming of babies and particular places: *Marion* may signify a boy or a girl or a city in Ohio or the fire company near my boyhood home or a business firm located anywhere. *Marion* or any other word may mean anything anybody wants it to mean.

Yet because morphemes and words do have long histories of employment, the study of the associations or connotations surrounding them constitutes a fascinating exercise. In a sense a word biography is as useful as is a biography of a notable person. Each plays a role in the cultural progress of the human race. Each is a datum in somebody's theory of something. Thus when Noah Webster set out to prove that God by supernatural grant gave the power of speech and a vocabulary to Adam, the Yankee schoolmaster proved his thesis to his own satisfaction — and thus invented the science of etymology — by finding some words in all modern languages and in the oldest language he knew, which was ancient Chaldee, the tongue nearest in time of origin to the Garden of Eden. In his researches Webster discarded many words and, though he did not know it, by this act proved that the meanings of words — and their transmission into other languages — are accidental, adventitious, and fortuitious.

It would be a poor culture, indeed, that would have words without flavor, without history, without "guilt or innocence by association." What would the western world, or the eastern, do for poetry if words were merely inert instruments? Wordsworth's

My heart leaps up when I behold
A rainbow in the sky.

is pretty dull stuff on the factual level, but as soon as the images work on our emotional nature we, too, are exhilarated, and we adopt a meaning for the words and for the sentence that Wordsworth never dreamed of. It is exactly this power of language to mean anything that we want it to mean, in accordance with the rules of the system, that makes it an instrument that *ab initio* must have no meaning in it at all.

Meanings are assigned to code elements for no known reason. The *-s* ending on English nouns has three meanings; on verbs it has a very different meaning. The final

-er in the comparative degree of adjectives and adverbs is very different from *-er* as a suffix on *farmer, New Yorker, double header, sprayer* or on verbs like *flicker* and *patter*. The morpheme *bick* is not in English, but the word *bicker* is. *Dure* has dropped from use, but *endure, durable, durative,* and *during* remain. Thus the code of vocabulary formation has power to keep words alive which the morphemes do not have. Each language has its own code morphemes; their meanings lie not in themselves but in the uses to which they are put. Etymology, therefore, though a valuable science in tracing and defining these meanings, can merely be an historical science; it is not a natural science, because it can never predict the coming of a new meaning or a new morpheme in the way that astronomers predict future eclipses. Semantics similarly has nothing to say about what will happen to words.

II

THE NUMBER OF MORPHEMES IN ENGLISH

Statisticians have counted the number of words in the written vocabularies of the Bible, Shakespeare, and other writers. But no one has counted the morphemes in an English dictionary of any size. Once the few hundred items in the code (affixes, inflections, and structure-words) are identified, the entry words in a desk dictionary prove to be about equally divided between base-form words and derivative words. Thus a vocabulary of 100,000 words shrinks to about 50,000 morphemes. Many of the latter are compound words, proper names, or foreign words or phrases, so that the number of English morphemes in the common vocabulary is further reduced to about 25,000. If the morphemes in proper names are taken from the 1960 census or from the Social Security roster, the number will be very large.

English probably has more morphemes than any other language, because English freely borrows words from foreign tongues. English has three distinct vocabulary-forming systems: English, Greek, and Latin. English readily combines words of native or Teutonic origin, as in *boathouse, houseboat, glee club,* and *ice cap,* and adds affixes from English *(abed, bespeak, forgive, foretell),* Greek *(antibody, hyperdull),* and Latin *(anteroom, de-ice, extrasmall, resell).* Greek roots and affixes combine freely to form new scientific terms, as in *antihistamine, electroencephalogram, parasympathetic, synapse.* Similarly are formed words from Latin, as in *deglutinate, globus pallidus, intratelluric, postcentral convolution.* Greek and Latin elements combine, as in *aureomycin, audiometer, intrathoracic, pseudostratified, reticuloendothelial.* A puristic tendency exists to keep new words wholly English, Greek, or Latin, but the needs of science being very great and knowledge of language being what it is many hybrids have developed. One can remark in passing that a scientist who devotes his career to creating hybrid plants or animals is not going to be squeamish about building vocabulary anyway he can. English permits the free combination of elements from all languages; puristic objections to this principle arose before the structure of the language was understood. Random inventions of vocabulary are also acceptable, like *kodak, keds,* and other trade names. Acronyms form another class of random inventions, such as *CARE* (Committee for American Remittances to Europe or, nowadays, Everywhere) and *SHAEF* (Supreme Headquarters of the American Expeditionary Forces). Some words come from proper names, as with *farad* (after Michael Faraday) and *Jeffersonite.* Most new words in English are either imported from other languages, or they are combinations of morphemes from Greek, Latin, French, German, and English. Fully half a million registered trade names in the U.S. Department of Commerce are of this kind, as in *Coca Cola, Frigidaire, Pennzoil, Samsonite.* America has freely admitted sixty million immigrants since 1840. A proper-name explosion was the consequence, because the democratic privilege of each man's keeping his own name has led to the retention of many – to English ears and eyes – unpronounceable and unspellable family names.

The statistics of English spelling show that of the 576 two-letter consonant combinations possible in English, only 137 are in use; of the 11,000 three-letter consonantal combinations, only 40 or so are used. As letters are added, the number of possible combinations increases, but the percentage of those actively employed goes down correspondingly. It is possible to assert, therefore, that a principle of economy exists on the morphemic and word level as it does on the phoneme level of language. A few units must and do carry the burden of meaning; they can do so because they mean nothing in themselves but only what the system makes possible.

III

THE TRIADIC PRINCIPLE IN WORD MEANING

Words take on meaning from the area of knowledge in which they arise. The comparatively small number of morphemes that can serve as surrogates for the vast world of fact — and thought and feeling about fact — make it necessary that the same morphemes (like the same house numbers) be employed in more than one area. A morpheme like *bough* (also spelled *bow*) serves in the areas of trees, boats (and, by analogy, airplanes), and social amenity. *Bound* serves in two areas of bodily action ('to leap' and 'constipated') with denotations essentially opposite in meaning, as well as in the areas of law ('under compulsion'), books ('covered'), human volition (as in "He is *bound* to go"), movement (as in "He is *bound* for home"), geography ('a limit,' 'a territorial abutment'), and as a combining form, that is, an item in the vocabulary-forming code, meaning 'headed in the direction' or 'going' (as in "The train is north-*bound*").

If morphemes can have many meanings, how can the particular meaning in a given utterance be determined? The answer lies, of course, in the principles set forth in the preceding chapter. A word must be located in its appropriate area and then it must be examined to see whether it is used literally, metaphorically or imagistically, analogically as part of the comparison system, or ironically. Ordinarily a term cannot be placed in its proper area unless it is united with two other terms in the same area. This triadic configuration of terms must be viewed as the first step in a process like that of triangulation in surveying, whereby an area can be mapped and its items can be located precisely. The following sets demonstrate the triadic principle; the morpheme *fly* needs replacement in appropriate areas:

1.	boy	boy	boy	boy	boy
2.	fly	fly	fly	fly	fly
3.	bird	kite	airplane	trousers	insect

1.	boy	boy	boy	boy	boy
2.	fly	fly	fly	fly	fly
3.	tent	flag	baseball	theater	sail

Thus it appears that *boy* is like a benchmark, fly is a variable whose position must be determined, and the third term is like a boundary marker. Normally in speech this process of term location is completed intuitively by an assessment of the contextual situation; in writing, the process often involves resort to a dictionary, a procedure that is an important element in scholastic training. The extent to which the intuitively achieved meaning is correct depends upon the previous experience of the hearer or reader. If he has never met the term, even a dictionary may be of no help if he has not an awareness of the operations of the vocabulary system. It is obvious that the traditional helter-skelter methodology of vocabulary learning has grievous defects and that the map method would be more appropriate in our schools. Words work by contrasts in their areas of use; hence usage must be associated with a knowledge of the map of the area.

IV

PRE-LANGUAGE SIGNS, LANGUAGE SIGNS, AND POST-LANGUAGE SIGNS

The eminent philosopher Charles W. Morris in *Signs, Language, and Behaviour,* (1946) presents a valuable classification of signs or signals of meaning. In a baby's awareness of a mother's exposed breast, in an animal's response to the presence of human beings, and in similar situations where language was impossible he saw the operation of pre-language signs. In them was meaning but no words, so that there is a mode of communication in circumstances as well as in words. Edward T. Hall's *The Silent Language* builds upon this concept much of his admirable discussion of gesture communication systems.

Language signs, of course, are the morphemes and words of the vocabulary of a discrete language. They are signs because they carry only that meaning which is given to it in specific areas of knowledge. The discrimination of metaphors, similes, images, ironic expressions, and symbols, though all are signs at one point in their usage, is essential in order to keep clear the vast difference between a sign, a metaphor, and a symbol. A sign is a morpheme or word that stands for a particular fact. A metaphor stands for a particular fact in its own area and a quite different fact or set of facts in the area upon which it is superimposed. A symbol likewise, as with Billy Budd, begins as a sign but adds to it many associated meanings, so that it becomes a gestalt of meanings drawn from all the areas that are temporarily associated with the sign. Thus *cross* is merely a sign in "He made a cross." But as soon as *cross* is associated with the last days of Jesus Christ, the word becomes a symbol. A man's fraternity pin is a sign of membership to outsiders. When a young lady receives it as a pledge of affection and future matrimony, she adds to its sign meaning a vast amount of emotional and experiential meaning. If the bestower has built into his pin a similar symbolic meaning, he cannot automatically convey his symbol associations along with the pin. He can try to explain his feelings and ideas, but the the recipient must accept and share them to attain a degree of similarity in symbolic meaning. Doubtless she can never quite achieve his views, and he cannot attain to hers. A symbol is the least communicative of all vocabulary items, because the receiver, like a rural Shinto soldier looking upon a Christian church edifice for the first time and without ever having heard about Christianity, so seldom has in his experience the necessary feelings and ideas to vitalize the symbol for himself.

For this reason great symbolical poems, dramas, novels, and short stories build their own symbol systems and do not rely upon publicly known symbols. Walt Whitman in "When Lilacs Last in the Dooryard Bloom'd" enlarged the meanings of lilac, star, and bird (a thrush or more likely a brown thrasher) in successive passages until their intertwining became expressive of meanings which volumes of ordinary expository prose could not convey. In *The Hairy Ape* Eugene O'Neill symbolized the plight of the lonely independent man who, in a day of organization, tried to fight against economic inequality. Erich Maria Remarque in his novel *Heaven Has No Favorites* (1961) endows his people with so much meaning that they, while still acting for themselves, represent the nations of the world casting aside wisdom and giving expression to compulsive inner drives to self-destruction. John Steinbeck's "The White Heron" and Nathaniel Hawthorne's "The Maypole of Merrymount" surcharge people, nature, and living things with symbolic values that are meaningless outside the context of these short stories.

Post-language signs are natural or artificial configurations that gain their meaning from the addition of human language. Thus the crossed arms on a post, whether inscribed with words or not, is a sign of danger when placed at the side of a highway at the point of intersection with a railroad. Not the structure itself but long usage in that setting has given this particular shape its meaning. The red cross of the International Red Cross has no specific meaning to a person who, otherwise unacquainted with its employment, comes upon it somewhere. Much of the world's gesture systems, as Edward T. Hall shows, are post-language signs whose meanings are intelligible only when they are explained in language. Like morphemes and words they carry the meanings which the culture — the area of use — gives to them. The principle of functionality applies to all forms of signs.

V

THE LIMITS OF METAPHOR

No little difficulty arises in human intercourse as a result of the misinterpretation of metaphors. Elementary students of language, for example, accept the term *family of languages* as if different tongues actually come by biological process from a "parent language." Religious people have become exacerbated at the doctrines of evolution and natural selection, two metaphors in the life sciences, because the erroneous assumption is made that these metaphors — and the theories for which they stand — contravert statements in the Bible. The melting pot, integration, balance of power, progressive education, race suicide, birth control, and planned parenthood are metaphors that have caused much quarreling, because they have been lifted out of their original contexts and have become symbols rather than metaphors.

A metaphor is a means of organizing experience in the manner of, but more loosely than, a symbolic model. Its purpose, as with the melting pot, is to employ a visual sign to accompany an abstract idea, so that the significant elements in the idea can be organized, analyzed, and tested. Metaphors go wrong and mislead users — I adapt

Wilbur M. Urban's thoughts here – (1) when they are slogans rather than symbolic models, (2) when they are used outside the area in which they had their origin, and (3) when they have meanings assigned to them that do not fit into the new area in which they are used. A metaphor is used well when it illuminates an area where it normally is not found; it works ill when utilized with the earlier meanings in any other areas than that for which it was invented.

CHAPTER VIII

THE POETRY IN OUR DAILY SPEECH

Our language, though seemingly a personal possession, is a heritage, a great tradition handed down to us by our forefathers. What we say and how we say it are not wholly expressions of our own making. We speak for ourselves, it is true; but our sounds, tone, accent, syntax, and tune derive less from ourselves than from the society which has formed us. The music of our individual speech has its origin in the normal patterning processes of our language. Whatever may seem unique in any individual's mode of expression is a variation upon these norms. Individual Britishers are easily distinguished from Americans, and New Englanders can readily be identified in a group comprising Southerners or Mid-Westerners. However numerous these variations may seem to be, there is a fundamental groundwork perfected and systematized, which unites – more than it separates – speakers of English in the four quarters of the globe.

A primary duty of scholars is to bring to each person's awareness the methods and principles by which an individual's language operates as a part of the total language. I say "total language," because the didactic devices of scholasticism have focused attention upon details of vocabulary and of individual choice in usage rather than upon the larger matters of language structuring. Emphasis has been put upon levels of usage – formal, informal, vulgate, dialect, slang — without clarifying the basic fact that a few words and a few structures are the touchstones by which levels are determined. And nearly always these matters have been described wholly in terms of writing. The primacy of speech is seldom dealt with, and the relationship between the code of speech and the code of writing has been blurred. Writing is a derivative of speech. Only as the spoken language serves as our source of knowledge can we perceive an individual's performance in the context of the "total language."

In our love of literary art we elevate literature into a realm apart from everyday life. "Such superiority do the pursuits of literature possess above every other occupation," wrote David Hume, "that even he who attains but a mediocrity in them merits the pre-eminence above those who excel the most in the common and vulgar professions." The ascription of an occult quality to literature and to literary activity has clouded many eyes and has prevented the recognition of the truth uttered by Schlegel: "Literature is the immortality of speech."

The language patterning of literature is identical with that of everyday speech. Even when the freest play of arrangement occurs, as in Whitman and Browning, there exists the basic operating regularity of the English language. These poets' variations are not inventions; they are formulas which have been shaped on the tongues of countless speakers. Their existence in everyday speech is seldom brought to attention, so that when they are subjected to analysis in literary study, they seem to be an invention of the author. It is a matter of doubt whether any author in the past five hundred years has invented a new syntactic structure. The basic formulas of the language lie deep in the hidden history of human expression; the Shakespeares and Joyces merely exploit these devices more fully than others. These authors' originality arises from new word combinations within old structures rather from syntactic novelty. The language methods of literature are precisely those of everyday speech.

I

THE SOURCE OF RHYTHM

The comparative inattention which has been paid to the over-all regularity of language operation has led to an over-emphasis upon the "big" words in the language — nouns, verbs, adjectives, and adverbs — and an under-emphasis upon the 300 or so structure-words. These structure-words are the gears and cams of language machinery; they shape the flow of "big" words in the web of literary expression. Determiners (articles), prepositions, clause markers (subordinating conjunctions and relative pronouns), verb auxiliaries and helpers, and other "little" language words form the almost unnoticed warp of the cloth; they recur so often that attention quite easily focuses upon the big words, the colorful and image-bearing woof. Yet without the little words there would not be the English language as we know it.

When we compare speech and written literature, we discover an appreciable difference in the number of structure-words in the two codes. The code of speech — a stream of sound uttered in time — and the code of writing or print — a sequence of graphic marks made on a line from left to right in space relationships — have some similarities and some differences. The greatest difference is that speech telescopes and truncates syntactic patterns, exploiting the context of physical presence through gestures, tonal changes, and pauses, while writing normally has syntactically complete sentences. Second, writing reflects normative procedures (fixed spelling as opposed to variants in sounds, fixed agreement patterns as opposed to variants, avoidance of rhyme, etc.). Third, writing, expecially in poetry but quite generally in all literary works, condenses expression. This compactness, as opposed to customary relaxed and free-flowing vocal utterance, is achieved in several ways. One of these is the suppression of structure-words. When Emily Dickinson described a grave, she wrote:

> We paused before a house that seemed
> A swelling in the ground;
> The roof was scarcely visible,
> The cornice in the ground.

Regular syntax would require the fourth line to be "Because the cornice was in the ground." Doubtless the omission of the two structure-words *because* and *was* (plus a verb like *hidden*) resulted from the poet's need to conform to the required three-stress line pattern established by the traditional ballad stanza. Still, such omissions are common in speech; the poet leaned as heavily on custom here as she did in using eleven structure-words in a stanza comprising a total of twenty-two words. The imaginative quality of the writing, therefore, resides not wholly in the metaphor of the house; the novelty of the image is paralleled by unexpectedness in syntax. Only as the normal patterning of structure-words is clearly understood can the literary artist's manipulations — by the repeated, emphatic use of them as in Whitman or the suppression of them — be relished.

Only as we perceive the operation of structure-words in speech can we discover their force as molders of meaning. The fallacy of emphasizing the big words is obvious when they alone are examined: *We paused, house, seemed, swelling, ground, roof, scarcely visible, cornice, ground.* The meaning resides not in these words alone, but in the total fabric of the two statement-sentences. The warp — the guiding threads binding together and shaping the picture made by the woof — is as essential in language as in weaving. The little words often, as here, really create the meaning as fully as do the big words. But, I repeat, the meaning resides in the total word content of the two sentences.

The structure-words play an even greater role as shapers of rhythm. The normal patterning of the English noun involves the use of an unstressed determiner in the premodifying position, as in *a house, a swelling, the ground, the roof, the cornice.* Parallel to this structure are the pronoun-verb sequence, as in *We paused,* and the clause marker-verb sequence, as in *that seemed.* The normal iambic meter of English arises not out of some mysterious and occult alternative tension and relaxation or some strange periodicity of unstressed and stressed syllables but out of the normal syntactical and sound structure of the language. One looks in vain in books on English versification to find an explanation of this relationship between our common speech and the music of poetry. Possibly at no point can the tie between language structure and literary structure be more easily exploited. The pleasing musical patterns inherent in the English language receive their shape from the syntactical arrangements. No literary artist has successfully imposed a foreign-language rhythm upon English. Longfellow, the best of the experimenters, failed to naturalize Greek hexameters; the following lines from *Evangeline* have an alien — or prose — quality:

Swiftly they glided along, close under the lee of the island,
But by the opposite bank, and behind a screen of palmettos,
So that they saw not the boat, where it lay concealed in the willows,
All undisturbed by the dash of their oars, and unseen, were the sleepers,
Angel of God there was none to awaken the slumbering maiden.

Similarly, Longfellow's importation of the rhythm of the Finnish *Kalevala* in *Hiawatha* chimes in our ears as a *tour de force:*

Ye, who sometimes, in your rambles
Through the green lanes of the country
Where the tangled barberry-bushes
Hang their tufts of crimson berries
Over stone walls gray with mosses,
Pause by some neglected graveyard,
For a while to muse and ponder
On a half-effaced inscription
Written with little skill of song-craft,
Homely phrases, but each letter
Full of hope and yet of heart-break,
Full of all the tender pathos
Of the Here and the Hereafter; —
Stay and read this rude inscription,
Read this Song of Hiawatha.

The experiments of Longfellow illustrate the age-old fallacy in traditional poetic analysis. Because the ancient Greeks had found the rhythmic patterns in their language and because the Romans had adopted the Greek concepts of prosody, Renaissance scholars assumed that, since Greek was the perfect language and Latin was next best, the Greek patterns must have universal validity. English scholars applied these principles to native verse and, through the scholastic system, effectually imprisoned poetry in a narrow jail-like compound.

Shakespeare escaped from dull routine by exploiting the potentials of syntactical variations open to him by the principle of functionality. Milton gained variety by varying the function order in sentences and thus altered the major stress system in iambic pentameter. Dryden grew petulant about the "little" words, because he deemed the inflected Greek and Latin languages more suitable to poetry than the analytic or compositional English language; he prepared the way for the Popean couplet by emphasizing the relationship between the message and the sound effects available in English. Pope's couplet writing sought a linked sweetness, particularly in the youthful pastorals, by interlacing alliterations and assonance to play, now with and now against, the rhymes and by unexpected recurrences of earlier alliterative sounds in later lines. Pope tightened English syntax and used few participles in his short-sentence style.

Wordsworth suppressed these internal sound effects by depending upon normally ordered syntax in both short and long flowing sentences. Poe infused into "The Raven" the full extent of sound and thus by his perfect manipulation of alliteration, assonance, consonance, and rhyme warned future poets to use these devices sparingly. Whitman discovered the principle of English structure and, having learned from Poe the folly of an anciently devised and imported formal regularity, created a poetry that gained its power through a maximum use of the "little" words and through phrase arrangements. Whitman also built his poetry on an imagistic presentation of concepts, so that he led the way in establishing a wholly new — a wholly English — mode of poetic expression. The good gray poet's one mistake, possibly, was his adoption of the contemporary fondness for inverted order. Yet by contrasts in word order he gained some of his best effects. Modern free verse, even if it be deemed in Robert Frost's words to be "playing tennis with the net down," followed Whitman's lead.

Great poetry makes maximum use of all the levels of the code and of the methods of syntactic and vocabulary operation. Few short poems can exemplify all the devices, but no major poem of whatever length exists without demonstrating that the source of its power lies not in the idea nor in the vocabulary but in its exploitation of the structural principles of language. The "little" words are the key that unlocks the magical room of English poetic rhythm.

II

METER AND STRESS-PATTERNS

Meter is the organization of recurring patterns of stressed and unstressed syllables in English and of quantitatively long and short syllables in Latin and French. Meter, which means 'measurement,' relates to the coherent sequence of similarly measured arrangements of linked units of sound, whether poetic or musical, within a formally constructed composition. Metric analysis proceeds by abstracting into a symbolic model the observable regularities in stress or quantitative arrangements of lines and stanzas. The message is ignored, so that the net effect of such a symbolic model is to give a poor musical score to an orchestral drummer or to a misguided reader, a reader who believes that these regular stresses or accents constitute a requirement in the correct reading of poetry. Great poetry plays against this kind of artificially formulated rhythm, just as great musical compositions do. The drum beat is a constant whose effectiveness is evidenced by the amount of substitution or functional variety that the composer introduces to modify monotonous regularity into rhythmic novelty. The traditional metrical analysis of poetry abstracts the sound of poetry so incompletely that there has resulted a false notion about the nature of poetic sound structuring.

The stress system of English has the primary level of stress on the sentence functions. A secondary level arises from the code of vocabulary placement. A tertiary level is in the code of vocabulary morphology. The fourth level is in the code of phonemic production, where vowels as the sounding tones receive greater stress than the consonants, although some consonantal groupings, as with *ngth* in *length* receive an extraordinary stress. The traditional analysis of an iambic pentameter line is as follows:

x ′ x ′ x ′ x ′ x ′
To err is hu man; to for give, di vine.

A full analysis would reveal that the function stresses are on *to err, human, to forgive,* and *divine.* The stresses in vocabulary placement are on *err, human, forgive,* and *divine.* The code of vocabulary formation puts stresses on *hu, give,* and *vine.* The variation in stress in all the sounds (since all are enunciated and thus have stress) is a result of the code of phoneme production as guided by, and in concord with, the other three codes.

A longer poetic example can more fully demonstrate these levels of stress. The following passage from Macbeth's speech in Act V, Scene iii shows how Shakespeare's iambic pentameter conforms to the language patterns rather than to schoolmen's metric analysis.

> I have liv'd long enough. My way of life
> Is fallen into the sear, the yellow leaf;
> As honour, love, obedience, troops of friends,
> And that which should accompany old age,
> I must not look to have; but, in their stead,
> Curses, not loud but deep, mouth-honour, breath
> Which the poor heart would fain deny, but dare not.

The primary stress is on the basic functions of noun (subject) and verb (predicate):

I
have liv'd
way
is fallen

that
I
must look to have
not

curses
mouth-honour
breath

The secondary stress of vocabulary placement is on the adjectives and adverbs, with the stresses falling on the headwords:

long
enough
life

sear
yellow
leaf

honour
love
obedience

troops
friends
stead

loud
deep

Clauses follow the principles of the primary and secondary codes; here stressed as primary but lighter are:

which
accompany
age
which
heart
would deny
fain
dare
not

And stressed as secondary are *old* and *poor.*

The tertiary stress of vocabulary formation is on *liv'd* in *have liv'd, nough* in *enough, fallen* in *is fallen, fall* in *fallen, yel* in *yellow, comp* in *accompany, hon* in *honour, be* in *obedience, look* in *must look, have* in *to have, curs* in *curses, mouth* and *hon* in *mouth-honour, deny* in *would deny,* and *ny* in *deny.*

The stress level in phonemic production is clear in that the "little" words like *have, my, of, is, into, the, and,* etc. have weak stresses like those in unstressed syllables.

Any enunciation, therefore, is made as a result of sets of choices. The final product is the result of these choices. Inexpert speakers and foreigners mispronounce because of an inadequate command over the four simultaneous options. What occurs must be viewed in terms of a computer or a multiple-choice control system. Only one sound may emerge at a time, and that sound must have proper stress, pitch, and linkage with associated sounds. It is a marvelous procedure.

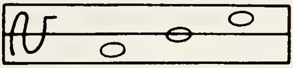
A complete symbolic model in a metric analysis, therefore, would present the artificial drum-beat pattern as the musical groundwork, but it would also present the four levels discriminated above. It is obvious that in poetry, as in prose, the rhythm, meter, and stresses result from the working of the vocabulary in the code. Poe, who had the best ear for language sounds, illustrated this principle in his analysis of poetry; he pointed out that the vocabulary must not necessarily be precise in meaning but must conform to the over-all pattern effects of sound being developed. The language system is always more important in poetry than the idea or message being conveyed.

III

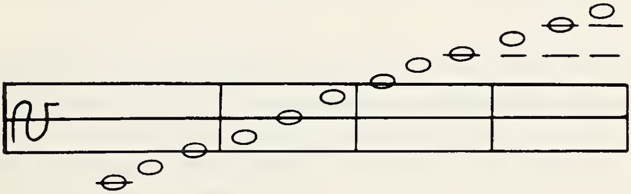
MELODY

The melodic principle in poetry has never been clearly defined. Nearly all prosodists assume that melody is the same as rhythm; even Poe equated the two. In music, rhythm is the drum beat, and melody is the upsy-downsy. "How dry I am, / How dry I am, / Nobody knows/ How dry I am" / illustrates the principle in music.

The meter is iambic. The stress patterns conform to those explained above. The musical organization, which works by its own principles and forces words to conform, is built on a four-tone melodic pattern. Of the twelve tones available, the composer chose four. One of the fallacies in literary criticism has been the assumption that the principles of music and of poetic composition are identical. But, as was seen in the chart of vowels, the English language has a gamut of three pitched tones. And, as was stated in the discussion of phoneme production, there are in English only four levels of pitch. That means four gamuts of three tones each or a total of twelve tones in normal speech production. If V serves as a clef sign for voiced sounds, the basic scale or normal gamut in English is



and the total register or extent of voiced sounds comprises low, normal, high, and highest gamuts:



The normal speech gamut does not have absolute pitch, as does music, but is subject to variation. Each speaker has his own normally pitched gamut and also related low, high, and highest gamuts. Singers accommodate their sung tones to music, so that their singing range is not necessarily the same as their speaking range. Since vocal music sometimes requires, as in "The Star- Spangled Banner," a range of more than twelve notes, few untrained singers can produce the highest notes easily. The norm of twelve tones in the American English-speaking voice must be placed against the eighty-eight tones on a piano to illustrate the differences in range between speech and music. The speaking voice has twelve tones to play with. Music has about ten times as many, and all of these can be present in a lengthy orchestrated composition, like Paul Hindemith's "Requiem for Those We Love," which renders the ideas and emotions of Walt Whitman's "When Lilacs Last in the Dooryard Bloom'd."

Music has laws and principles of structure; these are not the same as those in speech. As a consequence the musical settings of poems rarely correspond to the melodic intonation patterns of speech. The rhythm patterns, of course, are often similar. The melody in poetry, therefore, results from the pitch and stress levels of the code as manipulated by a speaker in conjunction with the emphases required by the message. Thus message and code interact here, too.

The melody in Macbeth's despairing commentary on his lost reputation arises, then, from the presence in the code of phonemic production of a differentiation in vowel grade or pitch (to give the three tones in each of the four gamuts) and a further differentiation in pitch to provide for the placement of a given phoneme in the proper gamut. Thus the melody — the upsy-downsy — of everyday speech provides for the heightened effects in poetry. All non-monotone speech has stress, rhythm, pitch, and melody. Ragtime and jazz emphasize rhythm, and so there is only a drum beat in

Shave and a haircut, bay rum.

In that line the vowel grade is unchanged from word to word, so that there is a structure of monotones. On the other hand a spiritual like

I got shoes. You got shoes.
All God's chillun got shoes

has upsy-downsy.

Few readers perceived the contrastive structural patterns in Carl Sandburg's jazz "Chicago," which begins

Hog Butcher for the World,
Tool Maker, Stacker of Wheat,
Player with Railroads and the Nation's
  Freight Handler;
Stormy, husky, brawling,
City of the Big Shoulders.

They tell me you are wicked and I believe them, for I
  have seen your painted women under the gas lamps
  luring the farm boys.

Initially it is obvious that a group of images of personification is being unified to give a montage or composite picture of Chicago. The staccato quality indicates that a ragtime or jazz emphasis on rhythm is present. The long-lined contrastive movement is in the "blues" pattern, so that the voice shifts from drum beat to melody. These two types of verbal music reinforce the imagistic method of representing thought. Thus the poem is wholly new in its prosody and Whitmanian in its imagistic rhetorical structure.

The inadequacy of traditional Greek metric analysis appears in Sandburg's justly famous "Fog."

The fog comes
On little cat feet.
It sits looking
Over harbor and city
And then moves on.

The basic metric unit is a sequence or foot composed of an unaccented and two accented syllables. No book of English prosody recognizes this unit, and yet the basic patterning of the language employs it, as in Walt Whitman's "Song of Myself," Section 9:

> The big doors of the country barn stand open and
> ready,
> The dried grass of the harvest-time loads the slow-
> drawn wagon,
> The clear light plays on the brown gray and green in-
> tertinged,
> The armfuls are pack'd to the sagging mow.

When Whitman's poetry is read in the intonation patterns of normal speech, the function stresses emerge as high in pitch: *doors, stand open and ready (open* and *ready* fill one function); *grass, loads, wagon; light, plays; armfuls, are packed.* Thus the stresses, rhythm, and melody of Whitman's poetry have no connection whatever with classical prosody but draw their architectonics from a programmed use of English speech.

The second paragraph of Section 9 shows a similar parallelism:

> I am there, I help, I came stretched atop of the load,
> I felt its soft jolts, one leg reclined on the other,
> I jump from the cross-beams and seize the clover and
> timothy,
> And roll head over heels and tangle my hair full of
> wisps.

The stresses are on *I, there, help, came; I, felt, jolts, leg; I, jump, seize, clover and timothy; roll, tangle, hair, full.*

The eight lines, despite their numerically varied content of 14, 13, 13, 10; 13, 13, 15, 14 syllables, are paired and have the same number of primary stresses: 3, 3, 2, 2; 4, 4, 5, 5. The secondary and tertiary stresses provided by vocabulary placement and morphology supply further variation from the classical metric system. By intuitively illustrating the principles of language operation, Whitman wrote the first poetry that fully utilizes the resources of the English language. Some of his poems, though their structure has never been generally understood, are still praised as among the best in the language; here is evidence that his artistry had a more substantial basis than has hitherto been stated.

Our daily speech provides the structural basis of poetry. The tongues of countless millions of speakers have worn habit grooves in our nervous system. Within a narrow gamut the tune of English takes its form and provides the framework for melodic variations. Unexpectancy plays against expectancy, limited novelty contrasts with familiarity, and originality avoids cliché. The charm of literature lies, to a large degree, in the successful maneuvering of sounds within a restricted system of syntax, language tune, and art form. A great artist renews his art at one or more points. But this renewal in literature must occur within the normal patterning requirements of his language. The ultimate test of his achievement is made by tongue and ear. All writing is a derivative of speech, and literature is validated by meeting the tests imposed by the spoken language.

IV

LANGUAGE AND THE TYPES OF LITERATURE

Another principle emerges from a philosophic view of the relationship between language and literature. It is that the structure of the language provides the basic structural patterns or forms of literature. Language is a system. It operates consistently in accord with a few principles. These principles are analogous to the laws of chemistry, astronomy, and mathematics. Lying behind diversity is unity; complexity upon analysis yields to simplicity. Where the medieval scholastics perceived chaos, we see order. What the scientist learned by painstaking research, the artist perceived intuitively. Hence it was that the primitive artist saw beauty, vigor, and normalcy in some rhythmic and in some structural patterns. The line lengths and the stanza patterns of verse resulted from the normalization of spoken usage. The phrasal or syntactic completeness of individual lines is not an accident in English poetic tradition. The addition of tonal effects — rhyme, alliteration, assonance, and onomatopoeia — resulted from the delight of auditors. The artist's urge to infuse novelty into familiarity was in harmony with the spirit of the language. Had it not been so, these devices could not have been used again and again. People cherish what they like and scorn what they do not enjoy. The ability to command these resources of language doubtless was, as it still is, an individual and not a universal possession. Audience approval or disapproval provided a kind of natural selection: living or usable forms survived, and the unusable ones disappeared. Even if ease of memorizing be invoked as a test of primitive poetic structuring, the fact remains that the ear plays a leading role in this process. Always we come back to the basis of literature: it is a system of structures which derive their forms from acceptable and normal speech patterns.

One of the favorite forms of arrangement in English and other Western languages is narration. Not only are fiction, biography, and history cast in a narrative mold, but much exposition, argumentation, and description follows the pattern of time sequence. When English and Chinese writings are compared, it becomes apparent that the provision for time in the Western World verb systems may be the cause of this developed habit of viewing experience in terms of chronology. Our language — which determines as much as it reflects our psychological responses — contains orderliness in time as well as orderliness in systematic operation. However hidden may be the origin of time formulations in our language, the effect of them has been more fully determinative of literary structuring than we have hitherto realized.

The actor-action-goal statement-sentence — the subject-predicate-complement sequence — has provided a basis for a larger amount of rhetorical structuring than has as yet been identified. The systematic and orderly process of language in its basic unit of expression — the sentence — indicates that intelligibility as a metaphysical ideal is inherent in our common speech. The larger units of discourse build upon the basic logic of the sentence. We perceive and conceive of the universe and of our experience within the framework of this mode of understanding. An analogy exists between the basic statement-sentence and a poem or essay which begins with a picture or image and then proceeds to show its relevance to human thought or emotion. This unexplored area belongs less to language scholars at the moment than to the logicians. But, if it is true that the laws of language are analogous to the laws of nature, then it would seem that the laws of rhetoric — of literary structure — are analogous to the laws of language.

Just as anthropologists and ethnologists are now discovering new truths about the cultural heritage of human beings, so our linguistic scientists are opening up new vistas of understanding in the field of language. Our heritage in language is our common everyday speech and the writings which derive from it. We can understand these writings better if we understand speech. Teachers have communicated to students and the general public an awe, an amazement, a sense of frustration, and too frequently a mood of hostility toward the sphinx that straddles the path on the road to literary enjoyment. Were the modern view of language known, hostile incompetence would change to knowing satisfaction. By seeing that their native speech has been transmuted by the artist into forms of meaning and beauty, readers would deepen, extend, and enliven their appreciation of literature. Instead of being merely an object of study, literature would become a chief mode of pleasure. By learning the operations and the dignity of speech, everyone can enter into the fullness of his literary heritage.

CHAPTER IX

SYNTAX MAKES LITERATURE

There has been bred in us an excessive adoration of words and an ignorance of or distaste for the systematic organization of words into syntax. If one follows Otto Jespersen in "Shakespeare and the Language of Poetry," Chapter X in his *Growth and Structure of the English Language,* the major element in the greatest of all Englist poet's works is words. The few references to the master's grammar and syntax are unperceptive and even denigratory, as in "He does not always place the words where they would seem properly to belong" (Anchor edition, p. 235). Jespersen, of course, was caught up in the late nineteenth-century preoccupation with morphology ('the internal structure and forms of words'), so that he never quite saw the language system which makes possible the tension in words and meanings. Usage study is predicated upon the wholly false notion that words have the power to operate *sui generis,* as if the panes in a window exist apart from the frame. The three elements of a language – in the descending order of importance – are the system or code, the tune, and the words. The most valuable words in English are three hundred "little" structure-words – *a, an, the, at, by, which, when, must,* etc. – that serve as the cams and gears of the machinery. The "big" words are only as important as the system makes them.

It comes as a shock to most people to realize that lists of words alphabetically arranged after being lifted from a poem become as dead as do the words in a dictionary. The art of the poet vanishes, the words wilt in meaning, beauty flees, and a void replaces emotion and idea. Words ripped from context become mere words; were we to practice lexicography in studying poems and fiction, a wholesome and corrective truth would become indelibly imprinted upon our minds. For example, *divine, err, forgive, is, to* is such a list; there is no hint here of the meaning, beauty, or tension in Pope's "To err is human; to forgive, divine." Words as words do not make literature: syntax does.

I

THE SYSTEM IS DOMINANT

Jespersen was dead wrong when he wrote, "As for the technical grammar of modern poetry, the influence of Shakespeare is not very strong" (p. 244), for Jespersen assumed that grammar and morphology are identical. When one examines the thousands of sonnets which have been built upon the syntactical patterns developed in Shakespeare's sonnets or even the influence of "To be or not to be, that is the question," one can realize that "technical grammar" has been viewed very narrowly by the eminent philologian. Grammar encompasses the entire patterning of the language; to fail to see the whole system is to call a cove an ocean.

Likewise Jespersen was dead wrong when he asserted that "in English a wide gulf separates the grammar of poetry from that of ordinary life" (p. 245). It is simply not possible for any poet to deviate from the systematic operation of language and retain intelligibility. The system has been created on the tongues of countless speakers; the poet merely employs artistically the devices which the common speaker uses artlessly outside the structure of tightly unified discourse. No poet has ever successfully violated the determiner-noun pattern as in "The man is here" by writing "Man the is here." What the poet may do is to give occasional vivid play to some structures which seem irregular. Most of the time his work remains within the commonest patterns of speech. Even so-called archaic forms, to which Jespersen alluded, survive in speech somewhere in the broad geographical areas where English is the native tongue.

II

THE INNER DYNAMICS OF LITERATURE

The inner dynamics of literature has barely been touched upon in literary criticism. There has been created no science for verbal art paralleling musicology. Harmony and tonality in literature are said to be discovered wholly in a few kinds of sounds (alliteration, assonance, rhyme, etc.). The interplay of syntax and metaphor or of syntax and sound has rarely been discussed; certainly there have been established no principles paralleling those familiar to the musician or painter. Yet the dynamics of literature lies in these interrelationships and not in surface patterns of rhythm and sound. Word-listing, rhyme-counting, and metric analysis carry a critic little beyond the staff, clef, and time indication of music. The significant differences in literature arise from an author's syntactical maneuvering.

A basic element in English is the marker-headword relationship. Such a sentence as "My plan will be to give a rapid sketch" (Jespersen, p. 1, with one word dropped) reveals that the iambic pattern in English comes from the systematic use of the structure-words called markers (*My, will, to, a*), which are normally unstressed. The trochaic pattern results from an unmarked initial headword, as in "Plans are made by men like Wilson." In music the tendency is to shift such a trochaic pattern to iambic by simply putting a rest as the first sign in the first bar. If it is recognized that syntax creates the stress patterns of English, then the idea that syntax determines literary dynamics will not seem strange.

The most important syntactical maneuver in English is the substitution of word-groups for single words in the four functions. An English sentence is not a sequence of words or of word classes; it is a patterned sequence of algebra-like functions. The basic functions are noun and verb, as in "Birds fly"; this pattern can also be filled by word-groups thus: "How birds fly is being demonstrated." The major unitary groups are prepositional phrases, clauses, verbal groups, and verb groups. The outmoded concept of parts of speech merely increases the mystery of language when conventional analysis worries over each word as a word. When, however, the normal patterning process of the language is seen to envisage substitution as a principle, the interchange of words and word-groups becomes a simple fact. When Walt Whitman wrote, "The other I am must not abase itself to you," he used the clause *I am* as a noun-headword in the noun function and did not hesitate to modify it in the usual way. Walt invented nothing here, nor is this usage a rare one in common speech. Walt was audacious in his syntax, that's all. By comparison with Shelley's "Be thou me," Walt's usage is far more expert, more true to the higher reaches of language potential than Shelley's. Shelley echoed a common speech form; Whitman exemplified a syntactical principle imaginatively. The vast amount of worry over Shelley's "bad grammar," as Jespersen would call it (p. 237), when compared with the failure to mention Whitman's dexterity, shows how unperceptive linguists' commentary and literary criticism have been in the analysis of poetic language.

The next most important syntactical maneuver in English is the somewhat freer movement of the adjective and adverb functions than the noun and verb functions in roving about in sentence order. An examination of any author's style will reveal quickly the extent to which he uses group verbals, clauses, and prepositional phrases in these functions; the number and the positions assigned to these word-groups play an important part in style. Indeed, we begin to get to the heart of the dynamics of style when these elements are codified, and we begin to see in their positioning a parallel to musicology.

Word order takes on meaning when it is seen that small units have absolutely fixed order, and that some of these unitary groups can work in various positions. Because there is a sense of fixity in function order, inversion is a meaningful syntactical device. If the basic patterns did not recur so frequently and were not established as "normal order," the contrasting uses would not show up. Similarly, if the functions were not filled so often by a headword, substitutions of word-groups for the headwords would not become readily apparent.

Once the play between fixity and movability is grasped, it is possible to discover the adroitness and the art of the writer. An analogy may help us see this principle. In football, eleven players take their positions at certain places.

Usually there are seven men on the line and four in the backfield. It is possible to vary this arrangement, but the variations must stay within certain limits. These variations and limits of football are the result of experience, and the variations and limits of language structure similarly result from the habits of everyday speech. Literature probably has never used a structure which has not been heard on the lips of many human beings. No poet has ever given a new syntactic structure to the language in the same way that some coaches have devised new positionings of players in football. The difference arises from the fact that the limits of the language structure in English seem to have been reached; football is rapidly reaching the same fixity as tennis, a game in which there has been no change in centuries. The players or words are different, but the operations remain the same.

III

WHITMAN'S USE OF SYNTAX

If anyone believes that the maneuvering of players in varied positions in football creates the dynamics of the game, then it will not be difficult for him to see that an author's choice and arrangement of movable syntactic structures develops the dynamism of literary language. The strategy of literature is no less important than that of a sport. In the illustrations which follow from Whitman and Shakespeare, I should like to insist that authors manipulate syntax to achieve artistic effects, that these effects add a new level of meaning to a work, and that the successful use of the effects provides a wholly new insight into the psychology of authorship.

Here is Walt Whitman's "We Two Boys," in which the eye immediately sees twenty-five verbals ending in *-ing* operating in the adjective function. Some of these verbals play a dual role by having the power of a verb to govern "objects." The position of the adverbs and "objects" of the verbals should be examined.

We two boys together clinging,
One the other never leaving,
Up and down the roads going, North and South excursions making,
Power enjoying, elbows stretching, fingers clutching,
Arm'd and fearless, eating, drinking, sleeping, loving,
No law less than ourselves owning, sailing, soldiering, thieving, threatening,
Misers, menials, priests alarming, air breathing, water drinking, on the turf or the sea-beach dancing,
Cities wrenching, ease scorning, statutes mocking, feebleness chasing,
Fulfilling our foray.

Despite the absence of "a complete sentence," there is a woven unity here which assures us of a complete statement; an interpolated *are* is not necessary. The first line states the subject and has the adverb in inverted-order patterning. The second line is in apposition with the first and intensifies the inversion by adding an "object" to the adverb in the complement. The remaining twenty-three verbals modify *We two boys.* Line 3 puts a prepositional phrase and two adjectives in the adverb function. Line 5 varies the structure by adding a past participle and an adjective to the *-ing* verbals modifying *We two boys.* Line 6 adds a determiner to the "object" *law,* which also has a prepositional phrase modifying it. Line 7 uses apposition of noun "objects" to vary the formula, and the last line clinches and resolves the whole structure by using normal word order. Most significant possibly is the way Whitman achieves, after twenty-five images in the *-ing* verbals, a binding or overriding image in the final word *foray,* meaning 'raid.' It might be noted that *foray* is not in Dr. Johnson's or Noah Webster's 1828 dictionary. Certainly this precise use of a fairly new word is not what makes the poem an artistic success. The *-ing* verbal, with its denotation of action, seems the best of all verb forms for the purpose here intended. Whitman knew what he was doing in playing with the system of syntax, the tune, and the words, for the same kind of adroit manipulation is everywhere in *Leaves of Grass.*

The first twenty-one lines of "Out of the Cradle Endlessly Rocking" build a brilliant total image of a reminiscence in much the same way. Walt uses prepositional phrases, apposition, *-ing* forms, and limited inversion. The fifteen line openings with prepositions become not a monotonous sameness to the eye but a consummate artistic victory when their image-making quality is seen and their tune is picked up by the ear. The first fourteen prepositions take on a far greater meaning than usually is achieved by structure-words. The fifteenth preposition *as,* the signal of similitude, welds the preceding disparate images into the unifying image *flock,* which in the final line is enlarged to *reminiscence.*

When Whitman's poems are examined for the interplay of image or metaphor with syntax, much of the complaint about the catalogs disappears. This is not the place to discuss in detail the art of Whitman; it should suffice to indicate that Walt's effects are achieved primarily by syntax and not by vocabulary *per se.*

IV

SHAKESPEARE'S "HAMLET"

The test of any theory of language, it is often said, must be made in an examination of the master user of English, Shakespeare. As indicated earlier, Jespersen failed to see much more than words and morphology in Shakespeare's works. A narrow view of "technical grammar" drew a curtain across the philologist's eyes. John Crowe Ransom in an essay "On Shakespeare's Language" discusses, as one of Shakespeare's supreme "poetic strategies," the compounding of Latin elements with the common English vocabulary in Macbeth's soliloquy:

Will all great Neptune's ocean wash this blood
Clean from my hand? No, this my hand will rather
The multitudinous seas incarnadine,
Making the green one red.

The third line is indeed memorable. But I venture to say that the polysyllabic words interested Shakespeare far less than the fact that he inverted the "object" and gave adverbial force to the *-ing* verbal. The syntax here is masterly, the vocabulary a jeu d'esprit. Shakespeare doubtless smiled as he wrote down the big adjective, but he patted himself on the back over the successful syntactical deployment. The very first speech of Macbeth in the play is "So foul and fair a day I have not seen"; he begins with inversion, and with inversion he speaks consistently. Also he uses a good deal of apposition, and clauses and verbals operate in the noun-function.

As the most generally acknowledged literary master-piece in English, *Hamlet* can be our laboratory. Here, as with Macbeth, each character uses significant syntactical structures as differentiating language traits. Horatio, who seems pretty well rattled by his awareness of the Ghost's presence, is given a fairly complex utterance in which relative clauses and post-modifying past participles play an important part in defining his mental quality. The king speaks involved, sinuous, long sentences. The syntax is marked by antithesis signaled by *yet* and *nor*, dependent clauses, inversion, word groups operating as headwords, and apposition. His words might seem to indicate no sense of guilt, for he seems poised, self-controlled, and unafraid. Yet the syntax indicates quite a different quality from that stated by the words. Here is a complex or disturbed mind, aware of its own deceit and duplicity, revealing its character through its mode of expression.

Polonius is known to us primarily as the giver of advice to Laertes; in that oft-declaimed speech the significant syntactical item is the imperative form of the verb. An examination of his other speeches shows that he uses this form to everyone, including the King and Queen. The old counselor is accustomed to giving orders, and Shakespeare keeps him true to his role throughout. The Ghost quite properly speaks with much inversion and with many past participles. Hamlet's speeches are marked by exclamations, command or wish clauses, parentheses, questions, and negatives: *no, not, never, nay, nor.* The sentences flow almost always in normal order. Occasionally, as in the famous soliloquy, infinitive forms play a leading syntactic role. In this same speech a clause fills the noun function: "what dreams may come . . . must give us pause." If syntax be the criterion, Hamlet is clear in mind, direct, forceful, speaking straight from the heart, an intellectual with great language skill.

If it be said that Shakespeare may have modeled his characters upon people he had met, so much the greater was Shakespeare for recognizing syntax as a distinguishing trait in a person's utterance. If it be asserted that Shakespeare invented his characters and assigned syntax to them, how much greater was his perception of the significant differences which syntax provides an artist. A full analysis would require the examination of the way Shakespeare maneuvered syntax and metaphor to get his best effects. Suffice it to say that the glory of Shakespeare's artistry lies not in the word list in the Cambridge edition but in the syntactical manipulation which gives tension and multi-leveled meaning to what he wrote.

Language is a system in which the number of operating items is very small; they include a few sentence arrangements, a few word groups, a few modes of modification, and a few ways of inflecting and forming words. When we realize that these units or structures encompass a dictionary of half a million words, the comparative unimportance of vocabulary can be grasped. The system lies in the recurrence of the structures and in the tune in the spoken language. The vast word-hoard plays an important role, as does the paper running through a printing press. But the printing operation would not go forward if the paper but not the machinery existed. A language lives in its system, and it stands to reason that the system puts its shaping impress upon the literature which is a product of the system. Syntax is the inner dynamics that makes literature.

CHAPTER X

READING: A BAG WITH HOLES

Someone has said that the human mind is a bag with holes. Medieval scholastics made much of the seven holes in the head. Sensations enter endlessly into the nervous system to etch themselves or to disappear. The possibility of total recall of one sequence and the impossibility of recalling a single sensory impression in another sequence serve as a reminder of a major problem in reading: some reading remains as a permanent possession and some does not. The reading process, too, is a bag with holes.

Some holes are necessary. Like any sieve or filing system some things are meant to be kept and some are meant to vanish. A good mind or sieve or filing system retains what is meant to be captured for whatever purposes the user devises.

In general the reading process is viewed as a necessary human action, one which every individual should master. One ideal of democracy suggests that a minimum attainment must be achieved by every person: a good citizen is one who has learned the facts through reading as well as hearing. Somewhat fallaciously it is assumed, despite the illiteracy of half the human race, that reading is a natural activity in which children will engage as readily as they breathe. The truth is that reading is an acquired art. It is neither a natural heritage nor a necessary act. It is an acquired personal possession.

The focus of attention must be upon the bag, not the holes. If we put aside all the problems involved in determining the nature of the human mind and its fundamental capacity to retain and filter out sensations, and if we accept as a truism the idea that any normal mind can learn to read, our first action must be to know the instrument that provides us with reading matter. We must know the nature of the bag and the way to plug up some holes while leaving others undisturbed: the necessity for leak and retention is inescapable.

I

THE FABRIC OF THE BAG: THE LANGUAGE SYSTEM

The fabric of the bag is the system called language. Language, which is speech, comes to a human being as a cultural heritage. Before he can learn to read, he must be an expert user of the few sounds and intonational patterns that form the oral transmission code. Just as one cannot use a Morse code until one "knows" it, so a child cannot read the code of print or writing until he has an automatic command of its basis, the code of speech.

The thirty-three meaningless segmental sounds in the English language are paralleled by twenty-six alphabetic letters of writing; they, too, have no meaning in themselves, and these letters when combined into words have only the meaning that is inherent in the group of speech sounds which the words replace. The group of letters in *pain* means 'a set of sensations related to hurt, suffering, anguish, distress, etc.,' in English, but the group means 'bread' in French. The sounds of the letter-groups differ in the two languages. Languages are structured organizations or systems, and any act involving these systems must be in accord with their operational principles.

Speech is also a rhythmic emission of vocal sounds in a time sequence. There are analogies with music in tempo, in pitch, in stress or loudness, and in pauses. In combination with the basic speech sounds the phonemes of pitch, stress, and juncture or pause create melodies to accompany or override the rhythms. These melodies and rhythms in speech are so consistent that they — like the march or waltz in music — are referred to as intonational patterns. The intonational patterns in declarative, interrogative, and imperative sentences differ greatly. Often it is possible to get the meaning of an utterance from an intonational pattern even if the vocal sounds are not themselves understood. In writing or print this meaning-giving device of speech is indicated by a few marks of punctuation and sometimes by italics, boldface type, or capitals. In most writing the intonation patterns — and the meanings carried by them — are not indicated at all; the reader must supply them. This hole in the reading-process bag is especially in need of being plugged, and the only way to do it is by asking beginning and weak readers to read out loud.

The second meaning-giving device in the system of speech is the regular and necessary arrangement of sound-groups into sentence-element-groups and sentences. The science of the systematic structuring of language is named syntax. This subject, which embraces the total set of operations, is usually dealt with under the heading of grammar. Included is the science of morphology, which deals with the changes that "words" undergo to express meanings (plural, past tense, comparative degree, etc.) or to fill certain positions or syntactical duties, as with the pronoun in "He gave him his books." The major principles that underlie the systematic operations of syntax are the grouping of words, word order in word-groups, modification, function order of elements in sentences, apposition, compounding, and substitution. The interplay of these principles gives rise to most of the data discussable under the general subject of style, but seldom has any author or speaker been subjected to a full analysis of his syntactical deployment of the language. A huge hole in the reading bag is this lack of attention to syntax.

In ordinary usage, style is usually equated with vocabulary, the third meaning-giving device in language. The overemphasis upon vocabulary results from the vast treasure chest in the dictionary and from centuries of study devoted to the fascinating history imbedded in words. Some notions are current that an increased vocabulary leads to accuracy of expression, but there is no real proof of this assertion. "Accuracy" is a relative term, and certainly in any scale of values accuracy in using the code or system is more important than the choice of one word or expression over its many fellows. There is no one way of phrasing any thought, but there are only a few systematic ways in which a thought may be expressed. That is, language is a device like a printing press; it works within fixed limits and can perform only a certain number of operations. The knowledge of these limits and operations is essential to anyone who uses the process.

The overemphasis upon the "big" words in the vocabulary has been particularly unfortunate in the teaching of reading. The nature of the English vocabulary has not been examined in relation to the maner in which words take on meaning from the conceptual areas where they work. The *Oxford English Dictionary* shows that the five hundred commonest words have at least ten thousand meanings. These many meanings give rise to all sorts of problems of comprehension when the words are viewed as fixed signs. But when these words are related to their contrasting mates in an area of discourse and then are pronounced in the context of the sentence in which they occur, the problems disappear for native speakers and are resolved for foreigners.

The commonest words are largely undefinable as separate words. Words like *head, go,* and *move* seem precise until their full scope of usage is examined. Less precise are the three hundred language-machinery words like *a, an, the, at, by, shall, that, where, what,* and *very.* These three hundred words appear once in every three words in normal English expression. If the total vocabulary of English is 600,000 (actually, counting proper names, the vocabulary runs into millions), these three hundred words that fill 33 1/3 percent of the total wordage constitute only .005 (five-ten thousandths) of the unabridged dictionary.

It is, indeed, a very large hole in the reading bag when these "little" words are disregarded. These three hundred words are largely group-forming words that shape the utterances and the meanings, just as the warp and woof threads shape the over-all nature of a cloth. The 600,000 words are the color-giving addition to the syntactical framework in which the structure-words provide the necessary internal ordering of the fabric of thought. To say that "big" words are of primary significance in the reading process is tantamount to saying that the color of a towel or the design upon it is more important than the fabric of which it is made. Only as the related systems of sound and syntax are understood can a reader enter successfully upon the enterprise of expanding his vocabulary.

II

PLUGGING THE HOLES IN LITERATURE

For some reason there seems to be a notion that reading skill is most readily improved by working through literary materials, especially fiction. Cut-down versions of classic novels are special favorites, as if the lure of great verbal art will snare illiterates in the same way that fish are believed to prefer an artistic fly over an ordinary hook baited with an ordinary earthworm. Whether fish go after lures or worms is a moot question, but there is no doubt about the unwisdom of trying to get a weak reader to learn new language forms and new ideas while he is trying to learn the reading process. It is the process, and only the process, of reading which is to be mastered.

Possibly the biggest hole in the reading bag is this failure to differentiate between the process and the end-result of the process. The process relates to needed eye perception in relation to possessed ear perception. The end-result relates to personal power, culture, education, and social and vocational status. The end-result is a highly desirable accomplishment. But it is seldom possible – as it is psychologically unsound – to try to learn the process and something else at the same time. In many human actions, mastery of the process must precede any performance in which an automatic flow of the process is essential to the success of the performance. One does not play Bach or Ravel on first fingering a musical instrument. In business the beginner starts at the bottom and works toward the top. In medicine a student spends years at study before he is permitted to prescribe for patients. The idea that a beginning reader or a weak reader may do what a medical student may not do is absurd.

The process of reading is not in itself a language activity. Real language activity involves original, dynamic production of speech. Reading is a repetition of someone else's language experience. Totally different circumstances are involved. The acts are analogous to Van Cliburn's playing a sonata by Beethoven. However great the art of the performer, he is not the creator. Nor is the performer's art wholly of his own making. He must lend himself to the work being performed. The sound system, syntax, and vocabulary of a writing may differ so greatly from the reader's as to require special study, even as Debussy differs from Mozart. The performance of reading — it is a performance — must follow a mastery of the techniques within the process, just as Cliburn practiced scales long before he ever played Chopin.

The techniques in the process of reading do not become clear necessarily from extended practice in reading. It is often assumed that comprehension results from exposure to material; certainly a familiarity with an instrument may lead to its better use. But many people with years of experience never manage to play a piano very well. This hole in the bag is so obvious that its presence need merely be mentioned. The holes that are seldom dealt with are in the dark bottom of the bag where they are seldom seen, for the reading bag reveals its fullness only with illumination. These hidden holes are labeled imagery, rhetorical structures, and re-presentation. These are the holes that let an awareness of artistic maneuvering escape unseen.

Although some readers recognize similes and metaphors, the range of expression available to an artist through image-making is wider than is ordinarily recognized. The embroidered A in *The Scarlet Letter* is easily seen, but how many readers notice the rocking chair or circle imagery in Theodore Dreiser's *Sister Carrie* or can understand Glenway Wescott's symbolic use of the bird in *The Pilgrim Hawk?* How seldom have literary critics, let alone ordinary readers, perceived "the figure in the carpet," the maneuvering of background images of light and dark, warm and cold in Henry James' "The Beast in the Jungle." These seemingly decorative items enrich, intensify, and deepen surface meanings. To miss them is to call a brocade a piece of muslin.

To miss Walt Whitman's or Carl Sandburg's juxtaposition of images, as in "Song of Myself" or "Chicago," is to misread the poems. To miss Stephen Crane's animistic pictorial devices is to misunderstand not only his art but also his message. To miss Hemingway's ironic juxtaposition of images of pleasant and unpleasant experiences in *A Farewell to Arms* is to lose his philosophy. The first three panoramic chapters of that novel lay the foundation for the understanding of the entire book. To read one word at a time is as useless as it is to listen to Debussy's "Afternoon of a Faun" one sound at a time. Some art proceeds one thought at a time, but some moves in long pictorial units, each of which is a total experience from which the relevant meaning must be abstracted. Such a work is Mark Twain's *The Adventures of Huckleberry Finn;* the opening shows that the theme is Huck's rebellion against the mores of his community. Only an expert reader can detect structural formulas and act accordingly. Most classical fiction has special imagery. Cut-down versions, by removing some of it, make almost impossible a full understanding of the writer's art and meaning.

The package in which writing is contained needs close attention. This hole in the bottom of the reading bag lets escape the meanings inherent in the necessary shapes or organizations which unite sentences. Good poetry and prose are as rigidly structured as is a waltz or a march in music. A newspaper item, for example, proceeds from important to less important facts according to the writer's or editor's scale of values. The assumption always lies behind an editor's handling of a spot news story that, if space requirements demand, the removal of paragraphs from the end through to the second will still preserve the major facts.

Formal essays, the serious ones in *The Atlantic Monthly, Harper's Magazine,* and *The American Scholar,* normally present the most important idea at or near the end. Newspaper items and formal essays are different in other ways, too. In general, newspaper items are inconsecutive, state facts and give no proof, rarely discuss the reasons for events, and almost never place these facts in the context of a learned discipline. A formal essay is less concerned with facts than with the author's interpretation of them. He takes pains to impose schemes of logical analysis and of order upon his facts and thoughts. In this procedure he uses age-old rhetorical methods: definition of terms, comparison and contrast, cause and effect, analogy, etc. The expert reader recognizes these devices and relates them to the over-all thought pattern being developed. The skeletal structure and the expansion of it are kept in perspective. The meaning, the expert knows, is to be found in the structure as well as in the successive sentences.

Fiction generally depends upon its structural formula much more than is ordinarily realized. The first sentence, first paragraph, and first chapter are of great significance, and the last chapter, last paragraph, and last sentence must — and usually do — have a similar significance. Even more, the opening and conclusion must be in the same mood and tone. Where the beginning states the theme and the fundamental situation, the end must give the resolution of the action and the theme. The opening sentence of *The Scarlet Letter* gives a picture of people; at the same time the music of the sentence reveals that a somber, brooding, solemn tale will unfold in the slow tempo of a threnody played by a symphonic orchestra. The second sentence states the theme: sin and death are inevitable facts of life. The rest of the first chapter gives the Boston setting, and the evaluation of the events to follow, the stylistic devices to be used: symbols, contrast between then and now, multiple explanations of phenomena, and nature imagery. The succeeding chapters up to the last one present moments of the action in terms of the stylistic devices and ideas given in the first chapter. The final chapter brings the action and the theme to a conclusion. The story outline is almost insignificant in contrast with the thought and artistic finesse of Hawthorne. To miss the ideas and the art, as they unfold in the narrative framework, is to miss the essence of the book. The structure of the novel — better than the author's words — explains why Dimmesdale must die. Only as a reader perceives the adroit arrangement of the necessary elements in the story can its full meaning be grasped.

There are not many structural formulas in literature. The most subtly varied ones are in fiction and drama, but despite surface differences the same basic principles apply: first, tension must be created by characters in a context of time, place, and ideas; a climactic moment must force a decision; and the decision must lead to a finale of the action and a resolution of the theme.

Some fiction is plotted to start with a conflict that must be resolved at the end, and some is not. Yet only slight differences set the plotted *The Scarlet Letter* and Howells' *The Rise of Silas Lapham* apart from the unplotted *A Farewell to Arms* and Dreiser's *Sister Carrie*. Essentially they are the same in basic organization; the real differences are in the ideas, syntax, and imagery of the authors.

This moment might be an appropriate one in which the reader of this chapter might ask himself how he has dealt with this essay's organizing image: a bag with holes. Has the intellectual basis been lost in a sea of emotional distaste? Are the reader's ideas chiefly about the image or the reading process? Would a comprehension test stress the bag or the process? Has the image made a logical structure possible? How do image and structure fuse?

The third large hole in the bottom of the reading bag concerns re-presentation, the art of a reader's projecting onto a mental stage the conversation, scenes, and action given by words. Since words are signs and also may be symbols, there are psychological steps whereby groups of words evoke mental images and/or concepts at the same time. Recent studies of the learning process, especially B. F. Skinner's *Verbal Behavior,* supply much valuable help in this area. Yet something further remains to be discovered about effective reading procedures. In a sense the power to project images is parallel to that of being able to remember a whole score of a long musical composition on its first playing. What is known is that an almost immeasurable superiority marks the mind that re-presents reading materials. How to give every reader this ability is a topic deserving attention.

Some of the holes in the reading bag are not likely to be plugged very easily. Some are there needlessly. The ones that seem most easily closed are those which result from the failure to relate writing to speech and from the inattention to syntax.

CHAPTER XI

WRITTEN COMPOSITION

The mode by which each child enters the spoken language suggests that an analogous mode must be adopted in learning to write. We are so accustomed to making language marks from left to right on an imaginary line that we assume everybody else employs the same writing procedure. We smile, therefore, when an Arab writes from right to left and puts page 1 at the back of the book or when a Chinese writes from top to bottom of a page. Nothing in the languages requires any one of these movements. Something in the social system rather than language led to these modes of placing one sign after another. The fact that we write from left to right with the right hand has led schoolroom designers to seat pupils so that the source of light is at the left and the pencil is never in the shadow of the hand. Some people have the notion that only the right hand should be used in writing our system; here is a questionable kind of psychology derived from a habitual social act. The principles of learning inherent in a child's mastery of speech — and not those derived from armchair guessing — provide by analogy the rules for learning to write.

I

NON-LANGUAGE DETERRENTS

The first step an adult can take in learning to write is to see what is language and what is social custom. In general, schools teach everything associated with language but not language itself. Incredibly difficult barriers are erected by these peripheral matters. For example, handwriting gets too much emphasis at the wrong time. Handwriting is not a language act; it is a socially necessary and useful accomplishment, but it is not language. It is a form of drawing, whose principles are wholly different from those of speech. Excellence or clarity in the formation of script or block letters, while desirable, is not a language ideal. Writing is a surrogate of speech, and consequently the learning of it must not be deemed more important than speech. A child should not be asked to write or print until he has mastered the basic code. An adult, whether rising from illiteracy in his own tongue or whether learning a new language, should defer writing until, through drawing exercises, he has mastered the manipulation of a pencil (or typewriter) and has enough of the code of speech in his mind to make his writing completely effortless.

Associated with writing is the social requirement of a specific arrangement of words and sentences on stated sizes of paper. No one can complain about this requirement, for a neatly ordered presentation of one's thoughts lends dignity to them. Yet the fuss over the observance of margins, the spacing of sections, the placement of footnotes or headings and signatures — matters which occupy many pages in textbooks — divert the attention of beginners from the main purpose of writing — the easy, rapid, efficient use of his communication system.

The posture of a writer also comes in for much comment. Good habits always help. But when a left-handed child is forced to write with the right hand or when a child is reprimanded for occasionally sitting in his own shadow while writing, the demand for socially correct etiquette has become a dangerous nuisance. The fol-derol that surrounds social behavior easily gives an exaggerated importance to the wrong items.

What is important is that a writer — child or adult — should have a desk or table where he can go readily and be comfortable. He should have the equipment — paper, pencils, pens, eraser, ruler, etc. — which he will need for writing and drawing. Few homes are designed nowadays to include either bookshelves or writing desks. The wonder is not that half our children are substandard in language; the wonder is that half the population succeeds in gaining competence in spite of social arrangements that are deliberately hostile to literary culture. It is a strange economy that provides vast palaces of learning for children during four or six hours a day for five days in a week and then denies these children a small corner in their homes for their other fifty or sixty waking hours each week.

For half a century American schools have treated writing as if it is only a school or business activity. A child is not expected to do much schoolwork at home. Fully half the children never see writing done in the home. A large segment of the school population literally believes that reading and writing are school tasks rather than daily duties. Our professional people sin against their children greatly; papa does all his writing (with a secretary's help) at the office, gets his mail at the office, and rarely writes at home. If mama does any writing and reading, she does these activities after the children are in bed. Their children haven't the slightest idea of the importance of written communication. As a consequence we have the disturbing situation that our colleges harbor more highly educated, socially well-placed, and financially well-established illiterates than is confessed to. One can understand why teenagers are suckers for the advertisement: "Don't write: telephone."

The result of a half century of these social pressures is the presence in America of a large class of high-paid semi-literate people who run the affairs of business and industry. To help them has arisen a class of ghost writers, public relations counselors, technical writing experts, and advertising writers who try to put into words and sentences what the doers know. America's oldest dictionary publisher recently was given a cease and desist order by the Federal Trade Commission for letting his ghost writers misstate the quality of his book. Test pilots have fallen to their death because of wrongly stated operating directions. It does seem as if a person who can put together a dictionary or design an airplane ought to have the competence to tell what he knows. If he can't, he suffers a lack that is correctible.

II

SPEECH IS FIRST

We repeat that speech is a social inheritance which a child masters by the age of six. By the time he enters school he produces the phonemes expertly, gathers them systematically into morphemes, and relates morphemes into syntax. More simply stated, the child employs the basic structures and tunes of the language with an expertness that will not be greatly increased — although his range will widen — through a long life.

From this fact of the child's mastery of the system is derived the principle that the code is more important than the whole vast vocabulary in the unabridged dictionary. The system must be taught if this child is to be given an expertness in writing paralleling his expertness in speech. For about three years a child's parents devote great attention to bringing him fluency and phonemic accuracy in speech. For three more years the parents give less and less attention to the child's speech, for by this time he plays with other children and makes speech his chief enterprise. He reaches out for language with a hunger that often exceeds his physical desire for food. Food he eats occasionally; speech is his ceaseless activity in waking moments. At six the school engulfs the child and sets out to make him literate, that is, to teach him to read and write. Only half the children do learn to read and write with any competence. The sheer human waste that results is appalling.

The steps to production in writing are similar to those in speech. The social situation that requires speech must be established for writing. The methods of learning must be analogous. This means that the system of language must be lifted to awareness. The capacity to speak must be utilized by making the crossover into writing a natural one. Expertness in writing the simple sentence patterns must be achieved first, and then the many ways of saying anything can be added as occasion warrants. Imitative pattern practice is essential whenever a writer is allegedly "at a loss for words." No one lacks words; he lacks experience in putting the words he knows in patterns.

We have said that the proper procedure is to lift to awareness the child's success in speaking. The mode of doing so for children is not through an explanation of grammar but through a vast amount of oral drill in which the patterns are filled with words taken from areas within his experience or into which he can be led. Family relationships, food, furniture, clothing, buildings, games, travel, automobiles, highways, airplanes, tools, nature, weather, animals — all the areas of physical experience into which he is pushing — can provide charted vocabulary from the age of six until about eleven, when he starts handling abstract concepts not related to physical experience. His expanding intellectual horizon can be paralleled with longer and more complex patterns of utterance. By thirteen or fourteen he can master the whole of syntax, including participle usage that is seldom given in textbooks. As a high-school student he is ready to handle the abstractions of science, so that he now can be taught the principles of the code of language. The constant oral drill will make him a ready speaker who will never be at a loss to frame a sentence designed to convey information he possesses. The process of adding vocabulary while perfecting habits of varying sentence designs should be accompanied by reading and writing appropriate to his age.

An adult learning any language should go through the same procedure in building proficiency in structure and phonemic production. Because he already has control of a large vocabulary and has the intellectual power to devise important messages, he grows restive when asked to defer important message-making until he has mastered the speech system. Yet his surest and quickest way to language proficiency is through the structural approach. He wastes time if he learns idioms and vocabulary, even if he has a momentary sense of victory in being understood in a few social situations. A total command of any language system is possible in a few weeks of concentrated effort, and once the system is learned, the whole dictionary can be gulped in those areas of knowledge which he knows in his native language. The key to success is the child's procedure: he learns the system first.

III

PATTERN PRACTICE

"The power or wealth of a language," wrote Leonard Bloomfield, "consists of the morphemes and the tagmemes (sentence types, constructions, and substitutions)." This doctrine of structural linguistics strikes at the heart of the scholastic dogma that a language is rich or expressive in relation to the number of words in its unabridged dictionary. Possibly no other single activity wastes more time of beginning writers than the mania for absorbing unrelated vocabulary items. What is needed is not vocabulary but the modes of language operation, the patterns of sentence and syntactical structure.

A glance at the nature of the vocabulary of English may provide some wholesome data. In the entire unabridged dictionary there are only 84 prepositions, about 50 clause-markers, about 25 verb-markers (auxiliaries and helpers), and enough other language-machinery words to provide a total of about 300 structure-words. They stand in sharp contrast with the 600,000 other entries. Yet in writing these words appear at least once in every three words (as in this sentence: *yet, in, these, at, in*). Most of them begin word-groups, and it would seem that a knowledge of the operating methods of these words would be essential.

The fewer the items in any class, the more important they are individually. Structure-words and adverbs need more attention than other word-classes. The verb, we know, needs special attention for other reasons than rarity; it takes many different shapes and performs a wide variety of duties. Adjectives seldom pose a problem. Except for spelling, nouns need no attention at all. They are all over the place.

But how do nouns come to be used so much? They play as subjects of verbs, as complements of verbs and verbals, as objects of prepositions, as independent elements, as headwords in so-called nominative absolutes, and by functional change as adverbs. What is important is their mode of turning up everywhere. For example, nearly every noun can be the object of several prepositions. If the working vocabulary of English has 25,000 nouns and these unite with only an average of ten prepositions, the result is a quarter million adjective and/or adverb phrases. If you have ever wondered why some writers clutter their style with prepositional phrases, you can now see why. Base-form adjectives and adverbs are relatively difficult to come by. The language books pay little attention to prepositional phrases; the implication of my remarks is that practice on this item is worth more than all the nonsense about levels of usage.

Clauses may be adjectives and adverbs. The problems involved in using word-class modifiers, prepositional phrases, and clauses in a single cluster can be resolved most easily by pattern practice. The noun clause in the subject position creates doubt as it emerges from some writers' minds. The panacea for the slow or inadequate handler of word-groups is pattern practice.

It is now possible to phrase some specific suggestions on the basis of the character of the vocabulary and of the syntax of English. Since the noun and its modifiers dominate English sentence structure, the most valuable point at which to direct attention is the noun function as subject. Once the management of the base-form of the word class is under control, the time has come to expand the noun group by adding determiners and adjectives in the premodifying position. The next step is to develop the patterns of the noun cluster, that is, to add post-modifying prepositional phrases and clauses. Amid a good deal of practice there might be an investigation into the pitfalls in overloading the subject position. The most significant gain will be an increased ability to manage a seemingly complicated structure. This newly acquired skill will afford ease in getting started and gaining momentum. Above all should come an insight into the variety of structure that is available. The same principles of operation apply wherever the noun function appears in English sentences (a few pronoun forms excepted); the play of the noun function after prepositions, verbs, and verbals can be lifted to awareness. In other Western languages with inflected datives and accusatives, a different treatment of the noun function is necessary.

The possibilities of varying the structure of the noun cluster are very great. Oral drill can show the types of pile-up which are possible with adjective prepositional phrases and adjective clauses. By moving into the area of verbals as modifiers, a beginning writer can begin to sense the dynamics of style created by syntax. At this point a select list of readings can reinforce the pattern practice. Stephen Crane's short-sentence style in *The Red Badge of Courage* can be contrasted with the long, involved sentences in William Faulkner's *The Bear.* Francis Parkman's *The Oregon Trail* exploits participle constructions. The later Henry James, especially in Chapter 5 of *The Ambassadors,* uses parentheses in the fashion of Chinese nested tables.

Pattern practice requires imitation for establishing habits. Slow writers should never depend upon their own resources; they should work at oral and written substitution within the limits of a few hundred words. Originality and stylistic variety are impossible as long as all the available syntactic structures are unknown. Everyone has a large storehouse of nouns; what is lacking is experience in shaping the nouns into patterns by using the simplest, most commonplace devices of prepositional phrases and clauses. Imitative practice in writing, as in sports, is essential.

In the early stages of pattern practice the reworking and rewriting of compositions is largely useless. More and varied practice and extensive production rather than the perfection of a few papers is the desirable goal. Just as youngsters run onto the basketball floor and practice, so must a writer. Practice, practice, practice. Only occasionally should the whistle be blown and the score be kept. Watch for and cherish improvement. Gain facility in handling ever larger and larger structures and then learn to cut them back to secure vivid clarity of expression. Work similes, metaphors, and images into the system. A little reading of Emerson and Shakespeare can do much at this point. One can feel that the end of pattern practice has been reached when it is possible to put one's own thoughts into the framework of a famous poem. Having gained a craftsman's mastery of his tools, in this case the structures of language and the modes of vocabulary operation, a writer is ready to say his own say in his own way.

CHAPTER XII

LANGUAGE AND SOCIETAL HOMEOSTASIS

The meeting in Vienna in June, 1961, of President John F. Kennedy and Premier Nikita Khrushchev dramatized the importance of speech in societal homeostasis or social stability. Two men, leaders of the two cold-war sides in a relentless world-wide power struggle, faced each other to achieve an understanding of each other's personal qualities. Each knew nearly everything the other believed. Each knew the positions taken by the other on political matters. Yet only by personal confrontation — not through the formal machinery of statecraft that employs viceroys and plenipotentiaries — could each "feel out" the other. The constant in politics is the ruler; the variables or substitutes, however dignified by title, can never adequately replace the constant in the mathematical equations of politics or of human interactions. The word was in the beginning, and the word remains as the sole ultimate agent in human intercourse.

It is not possible to exaggerate the importance of language in man's affairs, but it has been possible to misrepresent the nature of language and its effectiveness as an instrument in human welfare. Most of the world's aches and pains result from personal and even national inadequate command over language and the resources of thought and experience available only through language.

Suppression of language skill belongs among the devices of tyranny. Tacitus, when writing of the Teutons, never used a Germanic word; the policy of ancient Greece and Rome apparently was adopted by Peter the Great, who told Vitus Bering: "Invite groups of newly discovered people to join us and pay tribute. If they refuse, let them alone." Spying out precedes subversion and conquest. Just as Stalin forcibly destroyed the languages of Estonia, Latvia, and Lithuania, so the methods of dictators ever have included a language program. Hitler, for example, exiled foreign words from the German vocabulary, even as he destroyed millions of innocent persons who allegedly had the wrong blood strain.

Against a background of this kind can be viewed the need for a knowledge of language as a scientific instrument. The possibility is, with a widely diffused awareness that language need not be divisive, that language can serve its primary purpose of bringing harmony and unity to mankind. Toward this end I propose to examine language as it relates to individuals, to society, and to national and world culture.

I

THE INDIVIDUAL AND HIS LANGUAGE

Language is the device by which each human being organizes and sustains his personality. It is the sole instrument by which he moves from animality to personality. A baby comes into the world with physical and social potentials that his parents bring into actuality. At first he is self-centered, as solitary as a tree in his expression of needs and in his demands upon his environment. He grows into language by two. By three he shows a need for human companions outside the family circle and for knowledge. He asks many questions and makes few general statements. At four he wants companionship all the time, plays vigorously with his fellows, and talks much. By five he has a large measure of independence and roams the immediate neighborhood, a garrulous person who talks with everybody. At six he trudges to school and begins the long process of adding to his mastered language code the vocabulary and habit patterns that will shape him into a personality. His entire life in school is devoted to a language program and to the development of skills associated with language.

The teenager begins to specialize in those activities in which his skills seem to come naturally. Usually there are sex differences. The restricted life of girls puts them quite fully into grown-up language because of their continuous talk with mother, aunts, grandmother, and neighbor ladies. Boys move away from the home into gangs or teams. Teenage boys talk as their associates talk. Their concept of being grown-up is to imitate older — often ruder — boys. The source of juvenile delinquency often lies in unsatisfactory formal language training. Boys' skill in using teenage dialects shows their innate capacity for mastering a foreign language as well as their own. At this age personality and character become formed. If the home and school are doing a poor job, a boy's companions will supply reasons for his moving in his own direction.

A youth is plastic. He has the knowledge to rise above instinctual behavior and to shape his course of action to fit the mental images which now set the patterns of his conduct and thought. He needs words, thousands of words, to grasp the meanings of all that he sees and dreams. He needs to know the operations of the language system to put these words into usable sentence and rhetorical patterns. He has become a concept-making being, a thinker, whose value judgments determine what he will touch and what he will leave alone, what he will do and what he will not do, what future he sees ahead and what steps he will take to attain his goal. He is an interacting being whose conduct is of concern to his family, his society, and the state. He works or is idle; he plays organized games or he fritters away his idle time. Nowdays he is likely to marry early and take on the responsibility of a family. At eighteen he may enter the military forces, and in some states he can vote. His age causes him to be listed as mature, but his mode of existence in both his private and public worlds is a result of his previous training. His maturity or immaturity is determined largely by his language power.

The personality that issues at eighteen or twenty is so firmly fixed that only rare men like Benjamin Franklin analyze themselves and decide to slough off bad habits and develop better ones. The years of poor language skills now take their toll. Fully fifty percent of entering college freshmen, a group already highly selected, are deficient in language-using ability, not because they lack language — they have had the code since the age of six — but because they lack ability to talk, read, and write on their own age level, the three sets of skills which the schools are designed to give them. This deficiency, as a teenage problem, is world-wide, although it seems worse in the so-called culturally advanced nations. A teenager who cannot read a book or sit through a concert of classical music shows lack of experience, not lack of ability.

Probably no single invention has fastened ignorance upon some children so firmly as the test for intelligence. The I.Q. assigned to children is largely an indication of the amount of time it will take them to accomplish whatever is asked of them. Many schools, however, use these tests to screen children and excuse them from completing work in language, mathematics, science, and any task deemed intellectually difficult. The fact is that any normal child will rate a low I.Q. if his experience has been limited. These tests are tests of perceptivity, of acquired but limited skills, and of memory. The elements of human intelligence which are not tested are so numerous as to raise questions about psychologists' failure to modify their procedures. The worst feature of the tests, probably, is their threat to a child's educational future, particularly his future as a student of language.

Language tests are no better. Tests of spelling are merely tests of perceptivity. Tests of usage are tests of memory and often of editorial skills. No test has yet been devised to show a child's command of the language system or to lead him — as good tests in other skills do — to expand his vocabulary-using power. Misoriented teaching and testing of language bears a heavy responsibility for the existence everywhere of large groups of economically well-to-do but intellectually poverty-stricken youth.

Yet language is the instrument by which youth makes its peace with, or gets into trouble, in society. Only with language can youth frame concepts from its images. Only with language can youth open doors into areas of new knowledge. Only with language can youth put itself on a fair road to a full, reasoned, knowledgeable understanding of an adult's duties, opportunities, and responsibilities. Only with language can youth prepare itself for a well-chosen career.

Men are little different from youth, a little more settled, a bit more philosophical. But their conduct remains as random, as subject to alternations of mood, and as dependent for satisfaction upon physical things as does youth's.

Only as language power supplies the key to human growth can there be hope for an increase in the number of intelligent men.

II

LANGUAGE AND SOCIETY

Language is the organizer of society. The fundamental image in human life, says Kimball Young, is the mother-child relationship in nursing. There are givers and receivers; there is possession and there is need; there is accepted responsibility and there is helplessness; and there is love. Multiply by two billion this image, and one sees the world's human population living under similar conditions. Yet the latent dynamic in society, as dramatized by the mother-child image, somehow gets an incomplete and often perverted expression in society. This fact is strange, because society has organized itself as the code of language has. The individual represents the level of phoneme (individual sound) production; he is *sui generis* and yet he conforms to a general pattern. In his groups he operates by rules similar to those in vocabulary formation, and he takes up his duties in the positions pretty much as do words by the principles of vocabulary placement or word order. He marches to tunes set by the functionaries or rulers who are the variables that fill the stated functions in the machinery called society or the state. The image of the Kennedy-Khrushchev summit meeting is really that of two language systems trying to understand each other, so that the members of the other levels in the code can properly carry out their purposes and duties.

The central problem of society is not merely to organize its members — cohesiveness is easily achieved by rewards or threats — but to harmonize them into a cooperative group for the good not of a local state only but for the good of all mankind. The frightful damage at Hiroshima dramatizes the posture of society in this hour. Any city, any nation can be destroyed in the flash of one giant atom bomb. Such an image is the antithesis of the mother-child image.

The need of our times is a mode of unifying mankind. The only instrument universally available to man is language. By its proper use in social usages and rituals, there can be developed the attitudes and concepts necessary for a spirit of universal brotherhood. If individuals remain unskilled in language, society will share this backwardness. Since there is stratification or a hierarchical arrangement of word-classes, largely based on their duties, so specialization is possible in society if the principles of equality within functionality are operative. Any system has a rigid framework that permits a large amount of freedom, imaginativeness, and inventiveness in the working parts. This framework in society is a code of humane laws and the organized agencies of government which implement these laws. Every member of every state can gain the necessary language power to fulfill his role in such an enterprise.

III

LANGUAGE AND CULTURE

Language is the central manifestation of culture. Of all the persistent sets of habits of mankind, language is the only one that is constant from the age of two until death.

Other habits are comparatively temporary. From language comes the power to shape and transmit thoughts, develop attitudes, establish beliefs, create bodies of specialized knowledge, and to train skills in making tools, instruments, machines, and "all the material paraphernalia associated with living and society." Culture, however one defines it, would be impossible without language.

The existence of 3,000 discrete languages need not be a source of conflict between cultures any more than it need be between two states or two vast blocs of states. The American government embraces within its domain the cultures of the Western Man, the Red Indian, the Polynesian in Hawaii, and the Eskimo in Alaska. Language is no barrier; disadvantages accrue to individuals only temporarily, for an essential trait of humanity is a capacity to transcend differences in speech. Along the borders of speech communities promptly develops a hybrid tongue that serves both sides. No child with ears to hear long remains incapable of learning a new language. No man should stop his ears — for he must do so to remain incompetent in another language — as Ulysses did when passing the sirens.

The image of Ulysses' fear of a foreign tongue has dominated many people's view of language. Just as the conquering Romans ignored the natives' speech, so conquerors — actual or potential — equate their own language with concepts of superiority and the tongues of enslaved peoples as bearers of a lesser culture. These notions are foolish. No language is any better or worse than another. All can and do serve to transmit any message customarily made in that language. Wherever a language comes in contact with another culture, a rapid expansion of vocabulary — whether native or naturalized — soon puts the two languages on an equal message-carrying status. The upgrading of retarded peoples, whether white, yellow, or black, requires prompt and efficient vocabulary building to carry signs for all new things and concepts. Even more prompt should be the fostering of schools and other agencies of literacy to domesticate the new learning. Language is not self-generative. It is a child at the breast of its mother, culture, and needs fostering. Hence the giving of things or concepts or an imposed governmental organization is little likely to help progress unless language training precedes these gifts.

Translation from one language to another is easy to the extent that both have the same physical and conceptual signs or words. It is difficult when metaphors, images, and symbols in one language have no counterpart signs that can be turned to figurative use. Equivalence of sign is more important in translation than literal rendering. Great literature is difficult to translate because the conceptual and imagery systems may have no counterpart in the receiving language. The weakness in machine translation programs lies chiefly in this area. For simple factual prose a one-to-one correspondence in vocabulary and structure can be achieved. But resort to translation is always less satisfactory than a knowledge of the sender's language.

Thus we end with the thought that no short-cut — be it translation or an artificial world language — can replace a knowledge of natural languages. Nothing can replace a face-to-face conversation, whether of Kennedy and Krushchev or of Joe and Ivan, for it is through language that man, society, and culture maintain their stable condition. Language is a mechanism. Language is a science of human behavior.

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